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EDITORIAL.

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CONGRESS OF TUBERCULOSIS.—The Seventh International Congress of Tuberculosis has just closed its labors. Opened on the 24th of April, it lasted up to the 20th of May, and as its predecessors, has proved a grand success. The work has been divided into four sections, that of medicine, of surgery, of social protection and of etiology and epidemiology. As it is in that section that papers and communications connected with veterinary medicine were principally presented and discussed, I may offer to our readers, as a text of actuality, the résumé of a few among the most important.

1. HUMAN AND BOVINE TUBERCULOSIS, by Prof. H. Vallée, the Director of Alfort.

The researches of the last few years have clearly established the fact that whether isolated from the organism of man or that of bovine, the bacillus of Koch may be distinguished into two types, the human and the bovine.

The differentiation is made particularly sure by the following: Cultures on media, glycerinated or not, inoculations to rabbit and cattle. However, alongside the bacillar forms thus clearly differentiated, some examples of difficult or uncertain classification may be found.

The distinctions, established in that manner, do not allow us

to consider the bacilli of man and of bovines as two distinct species. All the facts accumulated in bacteriology demonstrate the extreme variability of microbian species, and it can be taken into consideration that, according to the conditions of life imposed by the hazards of contagion, the tuberculous bacillus adapts itself more particularly to such organism where it requires all its well characterized specific qualities.

The bacteriological identification of the samples of bacilli isolated from man gives precise notion of the unicity of the species of the bacillus of Koch. Statistics show, if the perfect value of the modes of bacillar identification are admitted, that about 10% of the cases of human tuberculosis proceed from an infection by bovine bacillus. It can also be asked if such bacillus taken from a patient and which possessed all the characters of the human bacillus was not itself, at the beginning of the infection, of bovine type. Numerous experiments show, in fact, the possibility of giving to the bacillus of Koch peculiar pathogenous qualities.

Finally, it would be also proper to take in consideration, in the appreciation of the possibilities of the transmission of bovine tuberculosis to man, of the difficulties of re-inoculation of an organism so readily a carrier of a latent or occult tuberculous lesion.

Conclusions: The bacteriologic study of the few last years has shown that human and bovine tuberculosis proceed from a unique bacillar species, susceptible, like various microbian types known, to adapt itself to the organisms that it infects and to acquire with each of its adaptations specific qualities.

Bovine tuberculosis is transmissible to man and principally to children.

Without giving to this peculiarity more importance than it deserves and *while observing that the majority of the cases of human tuberculosis proceed from contagion between human beings,* it is necessary to maintain entirely and even increase the precautionary measures already taken against bovine tuberculosis.

New researches are necessary in relation to the question of the adaptation of the different species of the classified types of the bacillus of Koch.

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TUBERCULOSIS AND MILK., by Prof. L. Panisset of Lyon. Conclusions of his report: 1. Trade milks contain in various proportion, very often superior to 10%, living and virulent tuberculous bacilli; similar observations are made on the derivatives of milk, such as butter, cheese, fermented milks.

2. The bacilli of Koch contained in the milk come from tuberculous animals, specially when these have specific mammary lesions.

With the absence of all lesions of the mammæ, macroscopically appreciable, the milk may be exceptionally virulent even with animals not recognized tuberculous, except with the tuberculine test.

Bacilli found in trade milks may also come from being soiled at the time of the milking. On account of such soiling, always possible, the milk of a healthy cow may contain tuberculous bacilli.

3. Bacilliferous milk, diluted for market, with a quantity of healthy milks, keeps for a long time its virulency. This explains the frequency with which the bacillus of Koch is found in the milk sold in cities.

4. The unicity of tuberculosis and the specific identity of the tuberculous bacilli of mammalia, not being any longer discussed by anyone, the milk, although containing bacilli of Koch of animal origin, may be pathogenous for man. On account of this condition, perhaps limited, but undeniable, however, of the digestive tracts in the etiology of tuberculosis, the use of tuberculous milk must be considered dangerous for man.

5. The danger is to be feared for children, specially for the youngest. It is certainly less for adults. Repeated and long consumption of raw milk of cows with mammary lesions is a great danger.

The drinking now and then of mixed milk, even bacilliferous, has also a limited danger, but which yet must not be neglected.

6. The general prophylaxy of the transmission of tuberculosis by milk is a part of the prophylaxy of bovine tuberculosis. The exclusion from a milk production of all tuberculous animals is difficult to realize sufficiently rapidly on account of the diffusion of bovine tuberculosis. To this point of view and for the present, one must be satisfied in obtaining from the Governments that the official collectivities should be provided only with milk furnished by non-tuberculous and healthy animals.

7. The difficulties of application and specially of the realization of a method of general prophylaxy oblige the prescription of rules for individual prophylaxy. The heating of milk at 60 degrees for twenty minutes or its boiling for several minutes are sure means to destroy the tuberculous bacilli and insure the innocuity of the milk. Pasteurization offers guarantee if carried out under official control; as it is for the needs of the trade it gives no certainty as far as sterilization of the tuberculous bacillus is concerned.

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TUBERCULOSIS AND MILK.—Prof. J. T. Heymans. The milk of cows can be contaminated by human tuberculous bacilli at the milking time or when submitted to manipulations by persons having open tuberculosis; unless previously sterilized, it can evidently infect man.

Milch cows, suffering only with closed tuberculosis, give milk free from bacilli; those affected with mammary tuberculosis secrete milk which contains almost always bacilli; those whose udder is free from lesions but have an open tuberculosis in another organ, such as the lungs, may contaminate their milk and also that of healthy milch cows, either directly or indirectly by their bacilliferous fœcal dejects. In a barn of milch cows, it is sufficient that one or several animals throw out bacilli to expose the entire milk of that barn to become bacilliferous. This milk

mixed with other healthy milks in central dairies may also become a source of infection for men and bovines.

Indeed, the milk containing living bovine bacilli infects most of the domestic animals, among which, as the principal cause, is found in porcine tuberculosis; it is also the most frequent cause of human tuberculosis with bovine type.

It is not yet proved that, in ordinary conditions of life the tuberculous bacillus of bovine type transforms itself in the human body, in bacilli of human type and vice versa.

All milch cows affected with open tuberculosis, and specially those suffering with mammary tuberculosis, must absolutely be excluded from milk production; by prophylaxy, general tuberculination and eventually by vaccination, one must attempt to increase the number of barns of milch cows, totally free from tuberculosis.

In the meanwhile, sterilization by heat imposes itself for any milk, unless there is perfect certainty of the absence of human or bovine tuberculous bacilli.

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Modes of Entrance and Diffusion of Tuberculous Bacillus in the Organism.—Report of Prof. M. Friedrich Weleminsky, from Prague.

Conclusions.—1. The first infection by tuberculous bacilli almost always takes place during infancy, so much so that 90% of children ten years old react positively with Picquet's test.

2. As the common form of tuberculosis in infancy is that of the lymphatic glands, specially the cervicals, and as pulmonary tuberculosis is very rare in scholars, it is certain that the primary infection which can be traced with certainty, that of infancy, does not begin generally in the lungs, although children are exposed to the aerogenous infection as much as adults.

3. It is then probable that the ordinary form of tuberculosis of adult, the pulmonary, is not either a primary infection, but very often a continuation of the infantile tuberculosis of the lymphatic glands.

4. This thesis is also supported by the fact, proved experimentally, that animals, once infected with tuberculosis, after a certain time cannot be infected *de novo,* even if the original tuberculosis progresses or even would bring on death of the animal.

5. This fact may be observed in man. For instance, the cervical and submaxillary glands are not infected in phthisic individuals, although their buccal cavity is constantly occupied by virulent tuberculous bacilli.

6. Another argument in favor of the hematogenous origin of pulmonary tuberculosis is the relative immunity following mitral stenosis, which causes congestion or even increase of pressure in the pulmonary blood vessels, while on the contrary, insufficiency of the pulmonary valve ends regularly with tuberculosis.

7. The extremely frequent lesions of the bronchial lymphatic glands are easily explained by the direct connection of the entire lymphatic system, but specially, as it is easy to demonstrate by experiments on animals, by the direct connections of the bronchial lymphatic glands and the supraclavicular and cervical glands on one side and the retroperitoneal and mesenterics of the abdomen on the other.

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Prof. A. Calmette of Lille presented the following conclusions on the same subject:

1. It is established that conceptional infection is only a small factor in the propagation of tuberculosis.

2. In the immense majority of cases, in man, the bacillar contamination takes place in youth and infancy. It is proved by the extreme frequency of the positive reactions to tuberculine in children between one and fifteen years old. In large cities, one-year-old children, which were free from disease at birth, are already infected in the proportion of 10%. This goes up to 50% in children between 1 and 5 years and to 80% between 5 and 15. In adults it reaches or goes sometimes further to 87%.

In some subjects, the bacillar infection revealed by tuberculine, is not accompanied with any morbid manifestation nor any apparent organic lesion. In the greatest number lesions occur, follicular or limited, which remain for a more or less long time or perhaps always, latent. And again in others, tuberculization is realized and then appears the disease studied by clinicians and anatomo-pathologists under the name of tuberculosis.

The extreme frequency of bacillar contaminations proceeds on one side, from the necessity for man to live in compact social groups, increasing the easy diffusions of tuberculous bacilli thrown out by the diseased organism; and again because of the conditions of social life (lodgings, family livings, alimentation, etc.) increasing in number and severity the occasions for infection.

3. All open doors of an organism susceptible of bacillar infection may be a door of entrance for the tuberculous bacilli. Normal doors of entrance may thus be: the mucous membrane of the natural cavities, particularly the digestive, in those parts where they are more liable to absorb particles in suspension and also the pulmonary epithelium.

The introduction of bacilli can take place also through accidental doors, such as the mucous may offer them, the nasopharynx, the skin or any other tissues.

4. The bacillar infection, in man and in animals spontaneously or experimentally tuberculisable, occurs normally or primitively by the lymphatic circulation.

5. Experimentation, clinical observations and anatomopathology demonstrate the preponderance of the digestive tract as a normal door of entrance of the tuberculous bacillus in the organism.

This entrance of the tuberculous bacilli takes place most commonly without leaving on the surface or in the depth of the mucous, the slightest lesion. Cohnheim's law must then be left aside, as it does not answer the reality of the facts.

6. Pulmonary tuberculosis is most ordinarily but the late

manifestation of an infection, first by the lymphatics and later by the circulation, are already old.

7. In young children and young animals, specially sensitive, lymphatic and bloody bacillar infection assumes sometimes the ways of a septicæmia, without resulting in all the cases with the formation of follicular lesions or of tubercles. This septicæmia is frequently curable. However, if the tuberculous bacilli are not eliminated and if they create centers of symbiotic life with the lymphatic cells of the various organs, follicular lesions are formed and the subject remains tuberculous.

This tuberculosis can remain indefinitely or during long years as latent, recognized only by tuberculine reactions, and the carrier subject shows then a manifest resistance to reinfection. But, if the follicular lesions are numerous and disseminated in poorly protected organs, they progress more or less rapidly and give rise either to acute miliary tuberculosis or to an extensive localized infection.

8. Some organisms are naturally or may be made artificially unfit to undergo tuberculous infection. It seems, however, that the required immunity resulting from a mild anterior infection or obtained from artificial method, is not of long duration. It lasts only as long as the organism remains a carrier of bacilli or of latent follicular lesions. It disappears shortly after the time when the aptitude to reaction with the tuberculine ceases.

9. When the tuberculous bacilli enters in an organism, naturally or artificially rendered refractory to tuberculous infection, it may either remain as a harmless foreign body, while still keeping its vitality and its proper virulency, or it may be eliminated with the cellular dejecta of the organism by the natural emunctories, such as the liver or intestine, without losing its vitality nor its virulency towards other susceptible individuals.

It is exceptional that it may be integrally resorbed, the activity of the cellular products of the leucocytes being powerless to dissolve the surrounding membranes that insure its protection.

10. The virulency, that is, the infecting power of the tuberculous bacilli, varies:

(a) according to the animal species from which they come.

(b) according to the more or less long time that they have previously been submitted to the influence of external surroundings and physical agents (air, light, heat, desiccation).

(c) according to their introduction in the organism has taken place in massive doses, at near or distant intervals, or in small doses, single or numerous.

(d) according the condition of organism which receives them, whether it is free of all anterior infection or if already tuberculized.

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CONGRESS OF COMPARATIVE PATHOLOGY.—Some time ago I called the attention of our readers to a proposal entertained by the Société de Pathologie Comparie of Paris to organize an international Congress of Comparative Pathology. This Congress will be held in the Faculty of Medicine between the 17th and 24th of October. At the various sittings of this first international reunion of comparative pathologists, the diseases common to men and animals will not only be considered, but also the relations that may exist between the diseases of the different species.

There will be besides important papers and communications relating to vegetable pathology and the possible relations which may exist between certain diseases of plants and those of animals.

The principal questions which will be presented in the various orders of the day will be: Tuberculosis, human and aviary diphtheria, cancer, variola and vaccinia, parasites common to man and to animals, nervous diseases, rabies, comparative study of cirrhosis; pathology of inferior animals, experimental pathology, milk, vegetal pathology. As may be seen by this long programme, the work of this congress will be very important.

The committee of organization contains the names of many eminent pathologists of various countries, and among them are

found those of some of the most pre-eminent men in both veterinary and human medicine.

As already stated, all communications and applications for membership must be addressed to Mr. Grollet, General Secretary, 42, rue de Villejust, Paris.

IN MEMORIAM—LEONARD PEARSON.

This, I have received and for it I thank those who have thought to send it to me. It is a handsome little volume, where the professional life of our departed friend is passed in review. A biographic sketch is presented by his most intimate and devoted friend, Dr. C. J. Marshall, whose affection was illustrated by the giving of his own blood to save the life of the one he loved so much.

The memorial exercises with the discourses delivered by the learned gentlemen of the committee organized for that ceremony, are reported, all full of eulogies, worthy of that great veterinarian.

The little volume closes with the records of the tributes from friends and fellow-workers, expressing their feelings of sad regrets and referring to the relations that had existed between them and Pearson.

From everywhere, in the United States, in Canada, in Germany, in Denmark, etc., where Pearson was known and had friends, there came words of affectionate remembrances and deep sorrow at the news of the great loss the veterinary and scientific world had sustained.

In Memoriam will always bring to the mind of every American veterinarian the noble example of one, of whose services the profession was so much in need!

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BIBLIOGRAPHY.—*The rendering industry.* (L'Industrie de l'equarrissage.) Rational manipulation of the corpses of animals, of bad meats, remains from butcheries, etc., by M. Martel, Chief of the Sanitary Veterinary Service of Paris—published by

N. Dunod and E. Pinat, 47, Quai des Grands Augustins, Paris. Price 12f. 50.

This French work is written by a thorough sanitarian, with the intention of calling attention not only to the deficiency of the industry of rendering in France, but also to the great many advantages and benefits that can be derived by proper organized establishments with modern machineries and similar improvements.

In many parts of Europe these industries are well organized —the work is carried out in them in a manner which is far ahead of what it used to be, the results obtained are such that the notion of old time, that in a dead animal only the skin was of value, must be forgotten in the presence of the valuable products which can now be obtained by proper improved processes.

The work of Mr. Martel is presented handsomely printed, containing in 366 pages a minute description of the work in rendering establishments. It is illustrated by 122 plates and the contents are divided into 27 chapters. Amongst which, after considering the old methods of rendering and their imperfections and describing the modern processes with their advantages, some of the modern rendering establishments in Europe are referred to. The French legislation, the professional diseases, or those to which the men working in those establishments are exposed, and finally the legislation in some foreign countries.

Mr. Martel is already well known as a thorough sanitarian; he has already published other works on that specialty; his journal, l'Hygiène de la Viande et du Lait, is well known, and does good work; he is an authority. His last effort will certainly receive the appreciation that it deserves.

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BIBLIOGRAPHIC ACKNOWLEDGMENTS. *Intracellular bodies* associated with equine anemia, by W. B. Mack, D. V. M.; *Chicago Veterinary College,* Quarterly Bulletin; *The West Australian,* with a very interesting article on Milk Supply, by E. A. Weston, B. V. Sc. V. S.; from the *Bureau of A. T. bulletin* 473

on Tuberculosis; *circular* 182 on the Spontaneous oxydation of arsenical dipping fluids, by A. V. Fuller of the Biochemic Division; *circular* 183, on directions for constructing a vat and dipping cattle to destroy ticks, by H. W. Graybell, D. V. M., and W. P. Ellenberger, D. V. S.

A. L.

AUTO THERAPY.

In the September, 1909, issue of the AMERICAN VETERINARY REVIEW, Professor Liautard chronicled the results of *Autoserotherapy* in the treatment of sero-fibrinous pleurisy, which had been the subject of a communication from the *Presse Medicale.* We will not reproduce the article here, as our readers can refresh their memories on it by referring to the original on pages 638-39 in the number referred to. Suffice it to say, that the method described therein was the introduction of a Pravaz exploring needle into the chest, fill with the fluid from the chest cavity, and without withdrawing it entirely, it is carefully introduced under the skin and the contents are injected. Its result is to stimulate resorption of acute pleuritic effusion. The quantity of urine secreted is suddenly increased; as much as three times the amount and sometimes more. Again in the January, 1910, number of the REVIEW, page 408, Professor Liautard writes under the caption of *Autoserotherapy,* speaking of the "new method much used in human medicine by German and French practitioners." A physician in St. Petersburg, by the name of Marcou, had applied it to eighty-two individuals, every one of whom had recovered, and from his experience he believed that it was applicable to all carriers of a serous or even hemorrhagic effusion; pus only being contraindicated. The same article relates the experiments of a Dr. Bourget in a communication to the Sixteenth International Congress of Medicine at Budapest, which treats of the clinical results of serotherapy in general, which are not so encouraging. Again, it is the mission of the REVIEW to record experiments with autotherapy; this time not *autoserotherapy,* and

not drawing the line at serous or hemorrhagic effusions and not excluding pus. So that under the head of *"Autotherapy—Its Application in the Treatment of Septic Diseases in the Horse,"* by Dr. D. J. Mangan (veterinarian), New York City, on page 422 of this issue, we give to the American veterinary profession the careful scientific investigations, combined with clinical records, of an American veterinarian in this method of treating diseases. Dr. Mangan has for sometime been studying the methods of Dr. Charles H. Duncan (physician), Attending Surgeon of the Volunteer Hospital, New York, whose success from this method of therapy in human practice actuated him (Mangan), to take up the work in veterinary practice. Dr. Duncan is regarded as an authority on the subject in the medical profession, and we shall publish a paper presented by him to the Veterinary Medical Association of New York City in the August number of the REVIEW.

DR. NORTON RESIGNS.

Older readers of the REVIEW, particularly those interested in state control work, will be interested and disappointed to learn that Dr. J. C. Norton has resigned and retired from state control work in Arizona. Dr. Norton was first appointed by a Democratic Governor, reappointed by a Democratic Governor, and successively reappointed by five Republican Governors. He has been in constant service there for 19 years as Territorial Veterinarian.

Among the many good things which Dr. Norton has done during that time and for which, in his modesty, he will probably never receive due credit, (unless someone publishes it for him), is the fact that from 1894 to 1900 he had in operation the field or pasture rotation scheme for Texas Fever eradication, and in those seven early years actually freed a large valley from Texas Fever ticks. Within the past few years this plan has been in popular use in many of the Southern states.

Practically all of the Arizona present veterinary sanitary laws are due mainly to Dr. Norton's suggestions. The present condition of Arizona's sanitary control work is suggested in a

statement recently published in an Arizona paper (which, with much other data, we have received through the courtesy of one of our esteemed collaborators, Prof. M. H. Reynolds, University of Minnesota, who has the honor of numbering Dr. Norton amongst his "old friends"), commenting upon his resignation, "Stockmen have forgotten what a local quarantine is."

Those who know him will be very sure that his fine manliness and his energetic, clear-headed business ability have never done otherwise than gain public respect and confidence for our profession. The lives and the work of such men as Norton remind us over and over that our rank and recognition as a profession and the public respect we hold as a profession depends largely on the showing made by the individual veterinarian in his home neighborhood.

Dr. Norton is about to realize a long cherished dream, that of owning and operating a model dairy farm, on a large scale. We wish him all success—not for the money. He doesn't need that. We will all wish him success for the real social service he can render.

MULE PROVES BETTER THAN MOTOR-TRUCK IN UNITED STATES ARMY: Pursuing our former contention that actual demonstration and not sentiment must decide as to whether the horse-drawn or the motor truck is the more practicable and economical for general trucking, and therefore the one which will endure, we have extracted the following statement of Colonel R. N. Getty, Provisional Regiment, United States Army, from the *New York Tribune* of June 21, which shows that even the slower mule has won a victory over the motor-truck in the Army service: "The automobile demonstration has been such as to warrant the conclusion that it is unwise and unsafe to supersede army mules and wagons with the troops, by any other form of locomotion." We also extract from the Second Annual Report of the New York Women's League For Animals: "Although automobiles are increasing, all the business traffic below 14th Street is still being done by horses, and it will be for many years."

ORIGINAL ARTICLES.

ARSENICAL POISONING FROM SMELTER SMOKE IN THE DEER LODGE VALLEY, MONTANA.

By D. E. Salmon, D.V.M., Montevideo, Uruguay, S. A.

VII. (Conclusion).

The Poisonous Dose of Arsenic.

In the articles which have preceded, an effort has been made to show the quantity of arsenic deposited on the grass and hay of the Deer Lodge Valley, the quantity per 25 pounds of air-dry ration, the proportion which was soluble, and the quantity which existed in the organs of animals which had died or that were sacrificed for examination. Thus, there was found by Swain and Harkins in the samples of hay and grass, analyzed in 1906, arsenic varying in quantity from 1.7 grains (0.1102 gram) all the way to 123.4 grains (7.996 grams) per 25 pounds (11.36 kilos) of air-dry substance. It was also demonstrated by Haywood that from 22.2 per cent. up to 80.6 per cent. of this arsenic was soluble in water. It was, therefore, made plain that adult equine and bovine animals might ingest at times as much as 99.5 grains (6.447 grams) of water-soluble arsenic per day. However, the average quantity of arsenic per 25 pounds air-dry substance found by Swain and Harkins in 1906 was 25.2 grains (1.633 grams), and the average solubility in water, as determined by Haywood, was 54.1 per cent. The average daily dose of soluble arsenic ingested by adult horses and cattle, as indicated by these determinations, was, therefore, 13.62 grains (0.894 gram).

The question which is naturally suggested by these determinations is, "What is the minimum daily dose of arsenic which

produces injurious effects in these animals?" And it was found that this question was, at that time, by no means an easy one to answer. In order to present the question fairly, the writer will bring together such relevant data as he has been able to collect bearing upon this point.

Fröhner (1) gives the following table showing the average fatal dose of white arsenic in powder:

	By the Stomach.	On Wounds.
Cattle	15 to 30 grams	2.0 grams
Horses	10 to 15 grams	2.0 grams
Sheep and goats	10 to 15 grams	0.2 grams
Swine	0.5 to 1 grams	0.2 grams
Dogs	0.1 to 0.2 grams	0.2 grams

Kaufman (2) expresses the opinion that it requires 45 grams (1.5 ounces) in powder to kill a horse, while 3 to 4 grams (46 to 62 grains) in solution is sufficient. On the other hand, "Percivall mentions that two glandered horses getting 5 grains daily in a bolus were attacked, one on the 8th, the other on the 9th day, with shivering, loss of appetite, nausea, purging and other symptoms of abdominal irritation, imperceptibility of the pulse and prostration of strength" (3).

Porcher (4) says that certain veterinarians have reported fatal accidents with the horse following doses of 4 to 5 grams, given by the mouth with the object of combating the larvæ of the Oestrus. The same author refers to a sheep which was not incommoded by 32 grams of arsenious acid, also to a report by Durréchou of the death of a cow which had only received 5 grams daily for two days, or 10 grams in all. Detroye, with a daily dose of only 1 gram, reported a fistula of the second stomach with a cow.

Harkins and Swain (5) cite an experiment of Spallanzani and Zappa, who fed moderate quantities of arsenic continuously to a Durham cow for 46 days, when death resulted. From 0.5 to 3.0 grams (7.7 to 46.3 grains) of arsenious oxide were administered daily, the dose being gradually increased to the maximum, when the animal died. Spallanzani concludes from this

and other experiments that cattle will take without injury, over indefinite periods, doses of 0.5 to 0.7 gram (7.7 to 10.8 grains) of arsenic trioxide per day, and may indeed increase in weight under it. They first show toxic symptoms with doses of 1 gram (15.4 grains) per day. The maximum non-toxic dose for cattle is given as about 0.00015 part of arsenious oxide per day for 100 parts of body weight (1.5 mg. per kilo), or 10.5 grains per day for an animal weighing 1,000 pounds. They also cite the statement of Hertwig that he gave arsenic to eight different horses in doses beginning with 20 grains, but increasing to a dram, and continued these doses for from 30 to 49 days with no bad effects; on the contrary, the condition was improved.

To obtain a clearer idea of the toxic dose for horses, Harkins and Swain (6) fed a horse on flue dust containing a total of 20.65 per cent. of arsenic calculated as trioxide, and 17.89 per cent. of soluble arsenic, also calculated as trioxide. Considering only the soluble arsenic, the horse was fed two grams (30.8 grains) of arsenic trioxide for 18 days in addition to hay containing about 0.003 per cent. (5.2 grains per 25 lbs.). At the end of this period the animal died from poisoning.

To a second horse they gave 2.8 grams (43.12 grains) of arsenic trioxide in two doses, on the first day mixed with bran and on the second as a drench. On the fourth day the animal died.

A third horse died on the third day after having been given two doses of 7.5 grams (115.5 grains).

From all of these observations and experiments we must conclude that the action of arsenic trioxide in powder is very irregular. This irregularity probably depends partly upon the particular specimen of arsenic and partly on the individual animal. The principal cause of this irregularity, however, is the physical property of this powder, already explained, which prevents it from being moistened by water and enables a great part of it to pass through the digestive tube without going into solution. Nevertheless, it seems clear from the experiments of Spallanzani that a daily dose of 1 gram will produce toxic symptoms in some of the cattle which receive that dose; and from the experiments of

Harkins and Swain that 30.8 grains of soluble arsenic, calculated as trioxide, in flue dust, plus about 3 grains soluble arsenic on the ration of hay, or in all a daily dose of 33.8 grains (2.2 grams) may not only cause symptoms of poisoning, but fatal results in less than three weeks.

This experiment of Harkins and Swain is worthy of special attention for the reason that the arsenic was in the form of flue dust and hay dust, that is, in the form in which it was habitually ingested by the animals of the Deer Lodge Valley. In this form it is easily moistened by water, and no doubt the soluble part is dissolved in a very short time after it reaches the stomach. We should, therefore, expect poisoning with minimum doses, and much more regular and constant results from arsenic in this form than from white arsenic in powder. As a matter of fact, the result obtained by Harkins and Swain in this experiment differs little, if at all, from that which follows the administration of arsenic in solution.

Finlay Dun (7) says that "Thirty grains daily dissolved in potassium carbonate destroyed a horse in four days."

The following is a summary of an experiment made by the writer, bearing upon this point:

A horse of about 850 pounds, in moderate condition of flesh, with good circulation and respiration, and that had not been exposed to the arsenical smoke-products, was selected.

August 29, 1906. There was administered 20 grains of arsenious acid in powder.

August 30. Administered 40 grains dissolved in potassium carbonate solution and mixed with bran.

August 31. Animal slightly dull; appetite diminished. Repeated dose of 40 grains.

September 1. Animal apparently normal. Repeated dose of 40 grains.

September 2. Animal quite ill; dull; no appetite; excrement covered with thick, stringy, white mucus; pulse almost imperceptible; artery tense; respiration accelerated; urine voided in small quantities; slight paralysis shown by difficulty of walking;

temperature 102.1° F. Repeated the dose, but the animal only ate a few mouthfuls and did not ingest more than one-tenth of the arsenic.

September 3. General appearance improved, but has no appetite; drinks little and walks very stiffly. Mucous membranes red, pulse almost imperceptible, artery tense, temperature 100.8°. Endeavored to give 40 grains of arsenic in solution by injecting it with a syringe into the pharynx. About three-fourths of it was ingested.

September 4. Animal very dull, drowsy, without appetite, drinks little, excrement soft like that of cows, visible mucous membranes much congested. Artery at the jaw is tense and full, but pulse is small and weak, scarcely perceptible and could not be counted. Heart beats, quick, jerky, but not violent, 87 per minute; respiration 21; temperature 100.7°. Difficulty of movement has increased until the animal is hardly able to walk. Endeavored to repeat the dose, but only about one-half was ingested.

September 5. Weakness, drowsiness and paralysis more pronounced; mucous membranes very red; respiration easy, 21 per minute; heart beats quick, well-defined, 87; temperature, 99.8°. No symptoms of pain. No arsenic administered. Died at 10 a. m.

This horse died in seven days from the administration of the first dose. The total quantity of arsenic which it was attempted to administer was 260 grains, or 37.1 grains per day. The estimated quantity ingested was 194 grains, or 27.7 grains per day. This animal was severely poisoned in four days with 140 grains of arsenic, 20 grains of which were in powder; that is, an average of 30 grains a day in solution and 5 grains in powder.

Cornevin (8) gives an account of the experiments of Cocconi and Schappe on the influence of arsenic in fattening of ruminants. They commenced with bovine animals with daily doses of 0.1 gram (1.54 grains) of arsenite of soda and gradually increased to 1 gram (15.4 grains). Larger doses could not be given without the appearance of symptoms of poisoning.

There can be no doubt, therefore, that 30 grains of arsenic in solution ingested by a horse or bovine animal daily will soon produce severe symptoms of poisoning, and if continued will cause death; and that about half that quantity will produce symptoms of poisoning after a longer time.

Efforts have been made by various investigators to obtain a more definite determination of the poisonous dose by injecting arsenical solutions subcutaneously, intravenously and intraperitoneally, and such experiments seem to establish the fact that as the animal increases in size the fatal dose per unit of body weight decreases.

Thus, Löffler and Rühs (9) were able to give guinea pigs 6 milligrams of arsenious acid per kilo of body weight by intraperitoneal injection of their solution (dissolved in a solution of caustic soda and afterwards neutralized with hydrochloric acid) as a medicinal dose in the treatment of trypanosomiasis. In the same manner they were able to give 7.5 mgs. per kilo to rats.

Weber and Furstenberg were able to give rats as much as 8 mgs. per kilo in the peritoneum as a therapeutic dose.

Roehl (10) gives as the maximum dose of atoxyl per kilo for mice and rats 0.17 gm. and for guinea pigs 0.08 gm. That is, rats and mice, the smallest of the experimental animals, are able to support from 25 per cent. to 100 per cent. larger doses of arsenic per kilo of body weight than are guinea pigs, the animals which come next in size.

G. Brouardel (11) found the fatal dose (solution with carbonate of soda) for guinea pigs intraperitoneally to be 16 mg. per kilo, and subcutaneously 13 mg. per kilo. For rabbits subcutaneously, the fatal dose was 10 mg. per kilo.

With dogs, Rouyer and Feltz (12) found that the absorption of 2.5 mg. per kilo sometimes and 3 mg. per kilo always caused death. The writer has administered as much as 3.3 mg. per kilo subcutaneously (solution of Löffler and Rühs) without causing death; although the same dog died 10 weeks later from a dose of 2.9 mg. per kilo.

The fatal dose of arsenious acid subcutaneously for these ex-

perimental animals may, therefore, be placed as follows per kilo of body weight: mice and rats, 20 mgs.; guinea pigs, 13 mgs.; rabbits, 10 mgs.; dogs, 3.5 mgs.

Attention is directed to this diminution of the fatal dose per unit of body weight as the species increases in size, for the reason that efforts have frequently been made to calculate the fatal dose for the larger animals and man from these determinations made with the smaller experimental animals. The results of such calculations evidently have little value and we can only conclude in a general way that the fatal dose of absorbed arsenic for man and for horses and cattle is probably considerably less per kilo of body weight than for dogs.

The writer attempted to determine the maximum dose which could be given subcutaneously to horses without fatal poisoning. In one case, mild symptoms (dullness, loss of appetite, diarrhœa) resulted from 0.9 mg. per kilo. The largest dose reached in another animal was 1.6 mg. per kilo, and in this case the general symptoms consisted of dullness, very marked venous pulse in the jugulars, tense artery and weak arterial pulse. It appeared, however, that a great part of the arsenic was fixed at the points of inoculation, for notwithstanding great dilution (1 to 1000) and the injection at six different points, the skin over the entire area where the solution was diffused became necrotic and sloughed, as well as the subcutaneous tissues. The injections were abandoned because of the intense local action.

Holmes (13) fixes the maximum therapeutic dose of atoxyl subcutaneously for horses at 25 mgs. per kilo. Some writers have placed the toxicity of arsenic in solution at 40 times that of atoxyl, but according to Launoy (14), with whom the writer is inclined to agree, it is only 8 to 10 times as toxic. We might, therefore, conclude that about 3 mg. per kilo of absorbed arsenic would be a fatal dose for a horse. For a horse of 400 kilos that would be equivalent to 18.5 grains. As it probably requires 2½ to 3 times as much by the mouth to produce the same effect, the fatal dose of arsenic in solution when ingested would be for a horse of that weight from 46 to 56 grains, which corresponds

very closely with the results obtained by Harkins and Swain and the writer, as well as with the opinion expressed by Kaufman.

It appears, therefore, that a single dose by the mouth of 60 grains of arsenious acid in solution will probably prove fatal to a horse of 400 kilos (880 lbs.); that a daily dose of 45 grains for two consecutive days proved fatal (Harkins and Swain); that five daily doses of 40 grains each have proved fatal (experiment of the writer); that four daily doses of 30 grains each have proved fatal (Finlay Dun). As to smaller doses continued daily for a longer time, we have the conclusion of Spallanzani, and, also, of Cocconi and Schappe that 1 gram (15.4 grains) will produce toxic symptoms in cattle.

As to sheep, Harkins and Swain (15) gave to one which weighed 95 pounds, 0.181 gram of arsenic trioxide twice a day (5.57 grains daily). It died in 7 days. To another weighing 87.5 pounds they gave 0.123 gram (1.9 grains) of arsenic trioxide in the form of sodium arsenite once daily for 25 days. It died 8 days after the administration of arsenic was stopped, that is, 33 days after the beginning of the experiment. To a third sheep weighing 115 pounds they gave 0.055 gram (0.85 grain) once a day of arsenic trioxide in the form of sodium arsenite. It died at the end of 69 days. To a fourth sheep weighing 90.5 pounds they gave 0.021 gram (0.32 grain) of arsenic trioxide in the form of sodium arsenite for 35 days, and then increased the dose to 0.09 gram (1.39 grains). The experiment was concluded at the end of 90 days, when this animal was still living, but would probably have died soon had the arsenic been continued, as it had lost 30 pounds in weight during the 55 days that it received the larger dose.

Unusual Susceptibility to Arsenic.

The susceptibility shown by the animals in the experiments referred to above may be regarded as the average susceptibility. Among a considerable number of individuals there are always a few which are very much more susceptible than the average. The two glandered horses reported by Percivall which died from daily doses of five grains, are examples of this.

In human medicine, many cases of great susceptibility have been reported. The fatal dose of arsenic trioxide is placed by Peterson and Haines at about 3 grains of absorbed arsenic (2.8 mgs. per kilo), and the therapeutic dose of arsenic in solution (Fowler's solution) is generally from 1-50 to 1-10 of a grain. Peterson and Haines say (16):

"The writer has known cases that would have diarrhœa, slight colic, and conjunctivitis after taking two drops of Fowler's solution thrice daily for three weeks. A remarkable case of this kind was reported by Nicholson. After taking in two days 15 minims of liquor arsenicalis (B.P.) representing not more than one-sixth of a grain of arsenious acid, in doses of 3 minims after meals, an attack of diarrhœa came on, an erythema appeared, which covered the whole body, and the eyes were reddened. As soon as the arsenic was discontinued the symptoms disappeared."

In the hearing before the Royal Commission on Arsenical Poisoning Dr. Neech said he had the details there of a case of arsenical poisoning with *well marked paralysis* due simply to the administration of medicinal doses of arsenic. It occurred in Halifax. Sir William Church answered, "We know that condition very well. I have a photograph of the case here. It was due to ten minim doses (1-10 grain) daily, extending over three weeks" (17).

Mr. E. Sargeant testified before the same Commission: "At the present time I understand that 50 per cent. of the persons attacked still suffer from the effects of the poisoning, and, with few exceptions, those who have returned to work still complain of nervousness, debility and cardiac troubles. The men that I examined usually drank from 2 to 4 pints of beer daily, with an extra allowance towards the end of the week. Three females, whose beer consumption did not exceed one pint daily, came under my notice suffering from arsenical symptoms; in one case not more than half this amount of beer was consumed, and I calculate that the dose of arsenic taken would be equivalent to 1-20th of a grain per diem" (18).

What we learn from these observations is that while the aver-

age fatal dose of arsenic for man is 3 grains, there are some individuals who are paralyzed by one-thirtieth of that quantity (1/10th grain) daily for three weeks; others that are severely poisoned by one-forty-eighth of that quantity (1/16th grain) daily, and occasional individuals who present well marked symptoms after taking one-sixtieth of that quantity (1/20th grain) daily.

If the same proportion held true for horses and cattle, admitting the average fatal dose to be 60 grains in solution, some individuals would be poisoned by 2 grains daily, others by 1¼ grains daily, and a very small proportion by 1 grain daily, if continued a considerable time. It is not known that this proportion holds true for these animals, but the writer is convinced, both from an examination of the literature and from his personal observation, that there are some individuals very much more susceptible than the average.

The Condition of the Animals With Relation to the Estimated Dose of Arsenic.

The average daily dose of 13.6 grains of soluble arsenic taken by horses and cattle of the Deer Lodge Valley, as estimated from the chemical investigations, not only includes the factor of time (that is to say, the average for the different months of the year), but, also, the factor of location (that is the average of different ranches which were variously affected according to distance, currents of air, etc.). It is, therefore, manifestly impossible to draw conclusions from it as to any particular ranch. What it indicates is that the average quantity of arsenic ingested daily was somewhat below the toxic dose for animals of ordinary susceptibility. This explains why the great majority of the animals, at certain seasons of the year, presented no symptoms of arsenical poisoning. It probably is the explanation of the good condition of many cows, owned by citizens of Anaconda, which were permitted to pasture in the neighborhood of the smelter; but the extent to which the pasture of these cows was supplemented by arsenic-free food is unknown. At all events, cases of acute poison-

ing in 1906 were comparatively rare, and by acute poisoning is meant all of those cases in which active symptoms were observed.

In examining, however, a herd of horses in which there were no active symptoms and which were on apparently good pasture, it would be observed that a part of them were not in the condition that would be expected from the quantity of food which they were able to obtain. The hair was lustreless, on certain parts of the body it was unusually long, the animals lacked spirit and were sometimes even dull and drowsy. Examining them more closely, the so-called *garlicky breath* was easily detected, being much more evident in some than in others. It was not exactly the odor of garlic, but approached that odor very closely. When the warm carcasses were opened for examination, this same odor was given off by the internal organs, and especially by the intestinal contents, often in such concentration as to be nauseating to the persons who were near. Eating food in the restaurants of Anaconda, the eggs and the steak would sometimes be so saturated with this flavor as to be unpalatable. The strength of this odor as given off by the breath, the internal organs and the intestinal contents of the animals appeared to have a direct relation to the quantity of smoke dust that was being ingested, and to the acuteness of the lesions discovered at the autopsy.

An alliaceous or garlicky odor has long been associated with arsenic and with the carcasses of animals which have been poisoned by it. More than half a century ago, Dr. George B. Wood (19) wrote in his treatise on therapeutics:

"On a visit to Swansea, in South Wales, some years since, I was assured by respectable physicians of the place that at the copper smelting works in the neighborhood, which load the whole atmosphere around them with the vapor of arsenic, so that vegetation perishes in the near vicinity, and an alliaceous odor can sometimes be perceived at a considerable distance, the workmen themselves did not appear to suffer."

Peterson and Haines say (20): "White arsenic has no odor, but if heated on charcoal, it is reduced to metallic arsenic, which

in vapor has an odor of garlic," also, that arseniuretted hydrogen has an odor of garlic.

Autenreith says (21): "B. Gosio was the first to show that certain molds, grown upon media containing minute quantities of arsenic, produce volatile arsenic compounds characterized by a garlic-like odor."

Georges Brouardel says (22): "Certain authors have noted a particular alliaceous odor of the urine" (in arsenical poisoning).

Dr. Eugen Fröhner (23), in giving an account of a case of 15 horses poisoned by arsenic, says the feces had a plain garlicky odor.

So, also, Moussu (24) says that in arsenical poisoning the contents of the stomach exhales an odor resembling garlic.

The garlicky breath and the similar odor exhaled by the organs and intestinal contents of the animals in the Deer Lodge Valley must, therefore, be accepted as a sign of arsenical poisoning, and it seemed to be more marked there than in poisoning from arsenious acid elsewhere, probably on account of the form in which the arsenic existed as it came from the hot furnaces or its combination with the sulphurous acid of the smoke.

Another symptom which appeared to have some relation to the quantity of smoke dust ingested was the *gum line* which has been mentioned by several veterinarians who have described the condition of the animals in the smoke district. This consisted of a band of tissue at the base of both the upper and lower incisor teeth, slightly raised and of a red or purplish color, 1/8 to 3/16ths of an inch in breadth. It appeared to be due entirely to congestion, for it disappeared completely soon after the death of the animals which were well bled at the time of killing.

The heart action of many of the animals was weak and the pulse almost imperceptible.

Occasionally, animals would be seen with marked disturbance of the respiration, partial paralysis of the diaphragm and marked costal breathing, together with labored heart action and tense arteries.

The fact that a "gum line" (25) and, also, paralysis of the

diaphragm with costal breathing (*26*) have been observed in human beings suffering from arsenical poisoning confirms the conclusion that these phenomena, as seen in the "smoke district" with animals, were really symptoms due to that cause.

In many of the chronic cases, the symptoms were those of weakness, with more or less difficulty in advancing the limbs when walking. Some of these animals were emaciated and on autopsy the fat beneath the skin, about the heart and in the abdominal cavity was translucent, gelatinous, soft, trembly, like a gelatinous exudate, a condition described by Flemming and, also, by Herter (*27*) in their studies of *fat atrophy*. This is a condition resembling starvation and in these cases appeared to be due to the continued action of arsenic, reducing the appetite, disturbing the digestion, stimulating the metabolism and irritating the kidneys and liver.

It must ever be borne in mind in the attempt to estimate the damage caused by arsenic, that this poison acts not only upon the organs with which it comes in contact when entering the body and when being excreted, but that it has a special tendency to affect the nervous system. And it is clear that the extent of its influence upon the nervous system is most difficult to appreciate in animals, because they are unable to describe the depression of spirits and the weakness which they feel. Horses, which in the Montana atmosphere should have been able to travel the whole day without tiring, would in an hour or two lag in their gait, perspire profusely, breathe heavily, show weak heart action and be unable to keep up their pace.

In this connection, the symptoms recorded by Vidal, Marquez and Dubrandy in their communication to the Academy of Medicine (1888), as observed in the poisoning at Hyères, France, are of special interest as giving a clearer idea of the feelings of the victims:

"The movements were difficult, the legs seemed too heavy for walking. The patients were tired; they had some difficulty in their movements; then the sensation became increased; their legs became heavy; they only walked with the body inclined forward,

swaying as if they had difficulty in detaching their feet from the ground and regaining their equilibrium at each step they took. They advanced their legs half flexed, the toe of their foot dragging" (28).

Symptoms recalling these were seen in some of the horses of the Deer Lodge Valley.

In the autopsies, the congestion of the abdominal organs, and the general appearance of the kidneys and liver were easily noted; and later the condition of the kidneys and liver was quite accurately determined by microscopic examination; but when it came to the nervous system we could only get a general idea from the presence or absence of congestion of the meninges and from the quantity of liquid encountered in the brain cavities. Yet, what a tremendous functional disturbance there might be without its being indicated either by congestion or transudation! It may be that a sufficient search through the brain, the spinal cord and the nervous ganglia would reveal lesions to account for the depression of the heart's action and the heaviness of the movement, but it is evident that it would require the work of a histologist who had specialized on the nervous system and who could devote a great deal of time to the investigation. According to the writer's observations, the functional depression of the heart was not due to fatty degeneration of the heart muscle, but to a failure or disturbance of the nervous influence.

The autopsies that were made do not, therefore, reveal the whole story, and, so far as horses are concerned, they possibly leave the most damaging effects of the arsenic undiscovered. With cattle and sheep, the value not depending upon the freedom and rapidity of movement and their endurance on the road, the effect on the nervous system is of much less importance.

An unusual number of hemorrhages occurring in the tissues, especially in those of the brain, lungs and kidneys at the time of slaughter, or, at least, showing as recent lesions were observed, indicating, no doubt, a weakening of the vascular walls.

In the early summer, the symptoms were for the most part those of very chronic poisoning, but, later, as the smoke came

over the valley more frequently, there appeared the ulcerated nostrils, colics, cerebral symptoms, diarrhœa, disturbance of the heart and muscular paralysis. That some of the cases of colic, as well as the "fits" and "staggers" had other elements in their etiology than arsenical action is probable, but, admitting this, it is certain that the irritating action of the arsenic on the walls of the digestive organs favored the development of digestive disturbances and colics, and that the action of the arsenic on the brain increased the congestion about any chronic lesions which might exist in this organ and caused the development of active symptoms.

Dairy cattle would be doing well and showing no symptoms of poisoning, then the smoke would come over the pasture for a few days and there would be a sudden shrinkage in the quantity of milk which was obtained; there would be salivation and drooling of mucus from the mouth, constipation, often followed by diarrhœa, red and weeping eyes, loss of appetite, cough, garlicky breath and feces covered with mucus.

Salivation, the writer has found to be a common symptom of arsenical poisoning, and occurs even when the arsenic is administered by subcutaneous injection. It is, therefore, probably due to the excretion of arsenic through the salivary glands, and not, as might be supposed, to the irritating effect of the arsenic on the mucous membrane of the mouth when it is being ingested.

During the months of the year when the smoke was carried away from the valley by the air currents, the great majority of the animals did not present symptoms which would lead one to suspect, from their general appearance, that they were suffering from the effects of arsenic. There were, however, marked exceptions, one of which will be given as indicating how some animals would be poisoned during the most favorable portion of the year. This was a colt, 11 months old, which died June 30, 1906, and the postmortem was No. 26 of this series. It had been on the Para ranch for some time and was examined carefully by the writer 3 or 4 days before its death. At that time it was in a cachectic and very weak condition, with a well marked red gum

line at the base of the teeth, and with very long hair over the greater part of the body. The statement regarding its death was that it had been haltered and an attempt made to lead it to the stable, when it suddenly threw up its head, staggered, fell and died.

Autopsy notes: Two ounces of straw colored fluid in the pericardium. Lungs show many small hemorrhages under pleura, and, on section, throughout the tissues of these organs. The small anterior dependent lobules affected with broncho-pneumonia, and the small air-tubes partly filled with a cream-like exudate. Trachea and larynx very much congested. Stomach red in pyloric portion and mucous coat covered with thick, tenacious mucus. Small intestines red, acutely inflamed at various points, mucous membrane covered with thick, white, muco-purulent material. Colon has a large red area near diaphragmatic flexure. Bladder very congested, and contained a small quantity of thick, turbid urine, which turbidity on microscopic examination was found to be principally due to a great quantity of renal epithelium. Kidneys large, light colored. Liver large, friable, with large, light colored areas showing through the capsule, and contained 31.7 parts of arsenic per million. Vessels of brain very much congested. There was an extensive red area on the superior surface of the left cerebral hemisphere caused by distended vessels and extravasated blood.

The cachectic condition, the long hair, gum line, inflamed stomach and intestines, effusion in the pericardium, congestion and hemorrhage of the lungs, inflammation of the kidneys, congestion of the bladder, congestion and hemorrhage of the brain, degeneration of the liver and the great quantity of arsenic in the tissues of this organ are clear indications of arsenical poisoning.

This was an example of an animal retaining its appetite up to the time of its death, its stomach at the autopsy was found full of food, and although at that season of the year there was much less arsenic to be ingested than later in the summer, the liver contained far more than the average quantity found in that organ.

A great contrast to the case just given was that of another

colt, the autopsy of which was made August 11, 1906, and was No. 36 of this series. This case is of special interest because the diagnosis was contested vigorously and with great confidence by the defense. The writer in making the autopsy did not examine the anterior mesenteric artery and the experts for the defence, arriving soon after he had left, *did* examine this artery and alleged that it was completely obstructed by a thrombus, and that this obstruction was the cause of the pathological condition which caused the animal's death.

The writer's autopsy notes were as follows: Subject, two-year-old colt, weight about 1000 pounds; had recently died; no odor of decomposition.

Lungs very much congested, especially in the dependent portions. Hemorrhage into some of the lobules and interlobular lymph spaces. Mucous surface of trachea deeply congested and very red. Extravasations under the serous membrane of thoracic cavity beneath the spine.

Abundant, blood-tinged effusion in the pericardium.

Stomach, acutely congested; many hemorrhages of small extent under lining membrane of cardiac portion; recent hemorrhage in pyloric portion and in anterior portion of duodenum. Many hemorrhages under serous coat of small intestines, from mere points up to ½ inch in diameter. Mucous coat of small intestine acutely inflamed, in parts blood red; in anterior portion pigmented and hemorrhagic; in median portion gray and catarrhal; in posterior portion the contents were tinged with blood. Colon acutely congested, mucous membrane dark red; hemorrhages from a point to several inches across. Caecum, entire mucous membrane dark red.

Kidneys much congested; right weighed 3¼ and left 3½ pounds.

Spleen large, soft, almost a pulp, weight 5 pounds.

Liver, large, soft, weight 25 pounds, contained 2.2 parts of arsenic per million.

Bladder very much congested, hemorrhagic at opening of ureter, at which point was a firm, dark brown coagulum, ap-

parently a blood clot. Urine brown, tinged with blood. Microscopic examination shows vast numbers of epithelial cells and aggregations of reddish granules which seemed to be broken down blood-globules.

This animal had been on pasture and had been affected with colicky pains for several days before death; it had eaten little during this time, so that the ingestion of arsenic had been small, which doubtless accounts for the comparatively small quantity encountered in the liver.

The writer is of the opinion that this was a case of arsenical poisoning, and he is further of the opinion that the congestion of the trachea and lungs, the hemorrhages into the lungs and under the pleura, the large effusion in the pericardium, the hemorrhages in the stomach, the great congestion of the kidneys, the congestion and hemorrhage of the bladder, the large quantity of epithelium in the urine and the great congestion of the spleen and liver would not have been caused by a thrombus of the anterior mesenteric artery, even had the obstruction been complete. On the other hand, such lesions are common in acute arsenical poisoning.

The Excretion of Arsenic by the Mammary Glands.

The quantity of arsenic excreted with the milk is of much interest from several points of view; it is interesting to know that a considerable portion of the ingested arsenic may be excreted through this channel; it gives some indication as to whether arsenic is being absorbed from the digestive tract in dangerous quantities, and it furnishes a basis for deciding whether the milk is safe for consumption as human food. As this line of investigation was foreign to the legal inquiry then in progress, it was not pursued further than was necessary to establish the fact that arsenic was being excreted in considerable quantities with the milk, and that this subject was worthy of attention from a sanitary point of view.

The following table of anaylses by Harkins and Swain contains all the analytical data which were obtained with reference to this question (29):

Table Showing Quantity of Arsenic in Milk Produced by Deer Lodge Valley Cows.

No. of Sample.	Date, 1906.	Miles from Smelter.	No. of Cows.	Parts As_2O_3 Per Million.	Grains As_2O_3 to 100 Gallons.
1	Sept. 21	4.5 NNE	5	2.94	17.7
2	Nov. 3	3 E	1	0.47	2.83
3	Nov. 3	6 NNE	1	0.70	4.00
4	Nov. 3	4.5 NNE	2	0.18	1.08
5	June 28	4.5 NNE	1	1.40	8.42
6	June 27	5 E	1	1.00	6.02
7	July 2	3 SE	1	4.20	25.28
8	June 28	3 N	5	3.40	20.47
9	June 23	3 W	1	5.70	34.30

In considering the results of these analyses, it should not be forgotten that the ration of many cows, and at least some of those from which this milk was obtained, contained bran and grain imported into the valley and arsenic-free.

This table shows that the milk not only contained an appreciable quantity of arsenic, but that in some instances it contained a remarkably large quantity. That is, in sample 1, over one-sixth of a grain per gallon, in sample 8, one-fifth grain per gallon; in sample 7, one-fourth grain per gallon, and in sample 9, one-third grain per gallon. Should a person daily drink a pint of the milk from which sample 9 was taken, and ingest another pint with tea, coffee, custard or other food, he would be ingesting one-twelfth of a grain of arsenic per day. Should he in addition to this eat one-half pound of liver containing .30 parts per million of arsenic, as might easily occur in the Deer Lodge Valley, he would ingest an additional one-ninth of a grain, making in all nearly one-fifth of a grain per day. The reader can form his own opinion of what would happen should this person be one of those sensitive individuals who is made ill by a dose of one-twentieth of a grain of arsenic per day.

In the arsenical poisoning from beer which occurred in England, 3,245 cases of poisoning were discovered. The report says: "The quantity of arsenic in the beer has been in exceptional cases

as high as about 1½ grains per gallon—in one sample 3 grains. As a rule one to one-half to one-quarter of a grain per gallon or less." Of 160 samples of beer analyzed by the Brewers' Expert Committee, 84 were quite free. The remaining 76 contained from one-tenth to one-four hundredths grain per gallon; and 27 contained more than one-twentieth grain, a quantity which they regarded as dangerous.

The Royal Commission on Arsenical Poisoning reported as follows (30):

"In our view it would be entirely proper that penalties should be imposed under the Sale of Food and Drugs Acts upon any vendor of beer or any other liquid food, if that liquid is shown by an adequate test to contain one-one hundredth of a grain or more of arsenic in the gallon; and with regard to solid food—no matter whether it is habitually consumed in large or small quantities, or whether it is taken by itself (like golden syrup) or mixed with water or other substances (like chicory or 'carnos') —if the substance is shown by an adequate test to contain one-one hundredth grain of arsenic or more in the pound."

This commission did not make the above mentioned report until after it had completed a long and diligent investigation, having before it the results of many special investigations and the opinion of many eminent scientific men. It is tolerably safe to conclude, therefore, that the report is not far wrong in its conclusions and recommendations. This being the case, liquid food containing one-one hundredth of a grain of arsenic per gallon is dangerous even to adults. What then shall we say of the plight of the poor people of the Deer Lodge Valley who were obliged to nourish their babies with milk that might contain one-fifth to one-third of a grain of arsenic per gallon, or from 20 to 33 times the quantity that was regarded by the Royal Commission as dangerous.

The Opinion of the Court.

In his opinion in this case, Judge Hunt said (31):

"Let us now briefly inquire into the conditions of animal life upon the farms within a few miles of the smelter. After the

Washoe smelter commenced to operate many horses that were in pastures in the valley suffered form sore noses. The sore nose was observed in some horses on the Bliss ranch. Stated in ordinary language, the sore nose ailment consists of a sort of ulcer, from one to three inches in length, on the septum in the direction of the upper lip, and appears as if it was produced by a burn, or an irritating medicinal blister, or acid, the ulcer often containing a large piece of dead skin tissue, in a few instances involving the lining membrane of the nose, and penetrating the partition between the nostrils. The horses affected, generally speaking, also had garlicky breaths, rough coats, and suffered from diarrhœa; some were thin, some were quite easily exhausted, and many appeared to be unthrifty. The ulcers would heal with ordinary stable care, and the animal would nearly always recover if taken away from the valley pastures. Numbers of horses so affected were killed for examination, and post mortem investigations disclosed lesions affecting the stomach, intestines, liver, kidneys, spleen, heart, respiratory organs, and membranes of the brain. Chemical analyses of certain animal tissues were also made by experts, and more or less arsenic trioxide found. Many cattle also were affected. None of the cattle had sore noses. Witnesses say that this was because cattle can clean their nostrils with their tongues, while horses cannot. Some of the symptoms manifested in cattle were garlicky breaths, rough coats, coughs, tucked up bellies, scouring and drooling. Eliminating the sore nose, the lesions found in the cattle after death were generally similar to those found in the horses. In one of a number of steers that had been kept by defendants for experimental purposes on the Bliss pastures, which was killed for examination by Dr. Formad, of the government service, there were found vascular changes, epithelial changes, and connective tissue changes, which were evidently caused by an irritant poison.

"By again reasoning from facts seen and testified to by plain witnesses, and weighing what things were so actually seen with what experts have said, and with what experiments have been made, out of the mass of evidence, I must conclude that the lesions observed were caused by the irritant or corrosive poison arsenic.

This arsenic was deposited, to a greater or lesser extent, upon the fodders of the pastures, and when ingested by live stock, caused ailment and sickness. The most rational view is that the volume of the smoke stream, with its arsenic contents, is at times carried by air currents upon the lands adjacent to the smelter; that sometimes the volume is much more dense than at other times, depending upon atmospheric conditions, but that when the smoke is dense and low, there is a precipitation of more or less arsenic upon the fields, and that a sufficient quantity is precipitated to poison the pastures, so that animals feeding thereon are poisoned. Naturally, owing to variable winds, there is no rule of distribution of the smoke, so that there is no uniform extent of the results of the smoke upon animal life. Hundreds of animals which grazed in the vicinity near the smelter have never shown the slightest symptoms of poison; cows in the city of Anaconda have thrived in the highest degree; perhaps but a few animals, out of a large number grazing in the same field, have been affected at all—yet, after all, when the facts, as well as expert opinions, are assembled and harmonized, the strength of the whole proof is such that it practically excludes any general cause for animal unthriftiness other than arsenical poisoning.

"But, while the conclusion just reached is the only accurate one under the evidence, still, it must not be taken that it was arrived at without overruling a strong challenge to every single issue pertaining to live stock conditions. To some of these matters, it is proper to advert briefly. For instance, it is not to be inferred that the complainant has sustained his contention that the sickness in animals has been fatal, or that it has been so general through the Deer Lodge Valley as to make the raising of live stock either impossible or unprofitable in all parts thereof. Complainant called as witnesses less than half of the farmers in the farmers' association, whereas defendants introduced the testimony of a number of farmers, not members of the association, who have lived for years in the vicinity of the smelter, within the so-called 'smoke one' (smoke zone?), and who said that they had no trouble with their stock or crops since 1903, and that their ranches were profitable. Nor can it be doubted that upon the cross examination of

many of the complainant's witnesses, it was developed that there has been not a little confusion between live stock conditions which existed prior to 1903, and those that have existed since. These dates are most material, because, without doubt, great damage was done by the smoke before 1903 (partly to remove the cause of which the smelter was remodeled, and the high stack built), and because the gist of the present suit is to close the smelter to prevent future damage reasonably certain to continue.

"It would appear, too, as showing that the sickness is not fatal, that, notwithstanding the somewhat abnormal condition of animal life that has existed since 1903, the percentage of death rate among live stock through the valley in 1906, was normal, in that out of about 9,384 head of cattle and 1,632 horses accounted for, the total loss was 54 cattle and 38 horses. Animals seem to sicken slowly, and often fail to show their true condition without careful examination."

Thus, while admitting the general poisoning, the Court was not inclined to admit that the losses were such as to make the raising of live stock impossible or unprofitable in all parts of the valley. The reason for this skepticism as to severe losses appears to be partly the "strong challenge to every single issue pertaining to live stock conditions," which the writer can confirm, and which was made with all the skill of the numerous experts employed by the smelter company, the testimony being welded together by able lawyers, and, in addition to this, certain statistics as to the death rate during 1906. It should be remembered, however, that the experts of both parties to the suit were actively searching for animals showing symptoms of disease during the greater part of the year, and that those which were found were sacrificed for examination, and, consequently, did not enter into these statistics; also, that the farmers had learned to watch their animals, and when they showed symptoms of poisoning they were given the best hay or purchased food.

The conclusion of the Judge that the "animals seem to sicken slowly, and often fail to show their true condition without careful examination" agrees with the observation of the writer with regard to the animals as a whole, but it seems to the writer that,

owing to the conflicting testimony, the Court was not able to appreciate the full extent of the damage to the live stock from the chronic but non-fatal poisoning. All of the farmers interviewed by the writer were reducing their stock of animals and asserted that it would be better for them (the owners) if a considerable proportion of their animals died, as living they were of no value, but, nevertheless, must be given extra attention and extra feed.

Then, there was the great difficulty of producing young stock, of which practically all of the farmers complained. The insertion of a few of the notes made at the time the farmers were interviewed, generally on their ranches, will give an idea of this source of loss.

Matthew Smith said: "When the new stack went into operation, I had about 40 head of horses and 12 milch cows. Have lost since then 8 horses and 7 cows. I have now 1 cow (bought last fall) and 7 horses. The remainder of the cows were sold because they did not become pregnant or did not raise their calves, I have had about 5 mares all the time and have bred them every year, but have not raised a colt since the big stack has been in use. Some of the mares failed to get with foal, others dropped dead foals, and in some cases a living foal was born but died in a few weeks. There are six of the horses now with sore noses. It is impossible to raise stock successfully. I am unable to raise enough colts to keep in work stock and what I have are worthless. The ranch is 11 miles northeast of Anaconda."

N. A. Liffring said: "At the time the big stack went into operation, I had about 100 head of cattle and 22 horses. Have lost only 4 or 5 grown cattle, but went out of the cattle business because they would not breed and I could not make good beef of the animals that I had. I now have 11 head of horses altogether, including 5 mares which were bred last year and which produced only one colt. Some of the mares were bred as high as fifteen times without becoming pregnant. In 1905 I had 5 mares and raised 1 colt. Have only lost one grown mare since the stack has been in operation, but it is necessary to give more care to the horses than formerly, to keep them in corrales and feed them.

For these reasons I had to go out of the stock business, and nearly all of the ranchmen in this vicinity have got rid of their stock."

Mr. Liffring and Smith Cosens agreed to the following statement: "Formerly the increase of stock was supposed to pay for the hay that it was necessary to feed, but for several years there has been practically no increase; and formerly ½ to 1 ton of hay would winter a cow, but now it requires twice as much; nevertheless, there is more grass now than then."

L. E. Cosens said: "This year from 4 mares served there was produced 1 colt, and from 18 cows, 8 calves. Some of the females failed to become pregnant, others aborted. There are now 9 head of horses, all with sore noses."

The writer made notes of the conditions at nearly all the ranches he visited, but they were practically repetitions of the statements made in those just given. All agreed that it was very difficult or impossible to produce and raise calves and colts, that the older animals required about twice as much hay as formerly, that the cattle did not take on flesh well and the horses were weak and of little value. For instance, Jerry Ryan said he had in 1906 a team of horses coming four years old, one-fourth Percheron and one-half Hackney, weighing about 1,000 pounds each. They were not thriving on his hay and he concluded to sell them. When he tried them at the time of sale they were so weak and lacking in wind that he could only get thirty-five dollars each for them.

Dr. Formad, who made investigations for the Government, obtained statements from 49 persons showing that whereas the holdings of horses by these ranchmen in 1902 were 2,447, they had been reduced by 1906 to 423, and their losses of cattle were even greater. "The decrease was said to be due almost entirely to deaths, as on account of the unthrifty condition of the animals there was practically no sale for them. Three men who undertook to raise sheep went out of the business, and five other ranchers also left the valley on account of their losses during this period" (32).

It seemed to the writer, and he so expressed himself to the farmers and their attorneys, that the evidence as to losses from these several causes was not collected and presented to the Court

in as clear a manner as it might have been. Possibly, it was because of a lack of proper attention to this part of the case that the judge was not more impressed with the magnitude of the losses.

The farmers in their suit "prayed for a permanent injunction forever restraining and enjoining the defendants from operating a certain smelting plant situated near the city of Anaconda, Mont., and from treating ores described as containing poisonous and deleterious substances, and for general relief."

The paramount reasons for denying this prayer seem to be expressed in the following quotations from the "opinion" (33):

"Bliss will not be driven from his home if the operation of the smelter is not enjoined, for he never has made his home on his land, and never intends to—that is to say, there is no sentimental concern involved: there is not and will not be personal inconvenience or physical discomfort, or even annoyance, to him or his family on account of the smelter fumes. To him, the special damage which he has suffered or will suffer is an absolute pecuniary matter. Of such as he has suffered in the past, there could be exact ascertainment, and, for recovery thereof, there appears to be no reason why he cannot bring his action at law with trial before a jury, and obtain a verdict and judgment.

"Finally, in the last analysis, when, in connection with the attitude of Mr. Bliss, direct and vicarious, we weigh the uncertainty of his proof as to the amount of past damages done to his land, or of future damages to be done to his pastures by the acts of these defendants, together with the fact that he has not resorted to a court of law to recover any damages at all, and balance these matters against the stern fact that if the defendants are enjoined as prayed for, they must either buy the lands of the farmers at their own prices, or sacrifice their property; that, if enjoined as prayed for, their smelter must close; that, if it does close, their business and great property will be practically ruined; that a major part of the sulphide copper ores of Butte cannot be treated elsewhere within this state; that thousands of defendants' employees will have to be discharged; that the cities of Anaconda and Butte will be injured irreparably by the general effect upon internal commerce and business of all kinds; that professional

men, banks, business men, working people, hotels, stores and railroads will be so vitally affected as to cause unprecedented depression in the most populous part of the state; that the county government of one county of the state may not be able to exist; that the farmers of the valleys adjacent to Butte and Anaconda will not have nearly as good markets as they have enjoyed; that the industry of smelting copper sulphide ores will be driven from the state; and that values of many kinds of property will either be practically destroyed or seriously injured—remembering always, that the courts of law are open to Mr. Bliss—I hold that, under the evidence, as he has submitted his case, discretion, wisely, imperatively guided, by the spirit of justice, does not demand that injunction, as prayed for, should issue."

And thus ended what was, perhaps, the greatest contest in veterinary toxicology that has ever been heard, and the farmers lost their case, but not because of failure to prove the fact of poisoning.

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AUTOTHERAPY—ITS APPLICATION IN THE TREATMENT OF SEPTIC DISEASES IN THE HORSE.*

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I hope I will be pardoned for attempting to handle such a formidable subject as vaccine therapy; and if my efforts to elucidate the action of autogenous pus when administered internally in septic diseases in the horse will interest you sufficiently to give this treatment a fair trial, I will feel amply repaid for any criticism which my lack of completeness is justly entitled to.

According to Wright, when an individual recovers spontaneously from a bacterial infection, the cure is the result of the production of immunizing substances within the body fluids, evoked by the setting free of bacteria and their products from the focus of infection into the body; to this process Wright gives the name of "Autoinoculation."

We all know that opsonins are always present in healthy serum, and that phagocytes ingest and destroy invading bacteria, but are able to do this only after the bacteria have been acted upon by the opsonins.

Immunity according to this theory depends upon phagocytosis, and phagocytosis depends upon opsonins. Obviously, then, the degree of immunity depends upon the opsonic content of the blood. Later, it has been shown that the opsonins normally present are not the same as those developed in the production of immunity to a certain disease; *i. e.*, staphylococcus opsonins, developing as a result of a staphylococcus infection or resulting from the inoculation of a staphylococcus bacterin, prepare only staphylococci for ingestion by the phagocytes.

Streptococcus opsonins prepare only streptococci, etc. The opsonins normally present show no such specific action, but act upon all bacteria in much the same way.

*Read before the June meeting, Veterinary Medical Association of New York City.

It has been readily shown by absorption tests that opsonins act upon *the bacteria* and not by stimulating the phagocytes to increase activity; also by comparative tests, that the opsonic and bactericidal power of the blood serum in an infection do not run parallel, and therefore are distinct entities.

The present day management of bacterial infections, outside of hygiene, sanitation, etc., is summed up in one word, immunity. Immunity means not only the non-susceptibility of an individual to a given disease and the power to resist the infection, but also the mechanism by means of which a cure is effected.

There are two forms of immunity, passive and active. Passive immunity is produced by injecting protective substances manufactured in the body of another animal; antitoxins. The diseases caused by bacteria that produce soluble extra-cellular toxins in their growth are the only ones from which antitoxins are made.

Most bacteria produce intra-cellular toxins, the toxins being bound up in the bodies of the bacteria.

Active immunity is the immunity induced by the production of immune or protective substances within the individual. This is the form of immunity with which we here will deal. Wright's method of treating infectious diseases by small infrequent injections of sterile bacterial vaccines consisting of the organisms causing the disease has to a great extent revolutionized the treatment of bacterial diseases. Just how and why it acts, we may not be able to tell. We know it stimulates the immunizing apparatus into activity and that we are copying nature's own methods; that is the spontaneous cure of infectious diseases by autoinoculations.

Massage, cupping, counter-irritation, Bier's hyperemic treatment, hot and cold applications and many other forms of treatment act in this way, namely, increasing autoinoculation. This gives an ideal explanation of the beneficial results obtained in the application of mustard to the chest in pneumonia cases, where the infecting agent, with the products of its metabolism congregates in the lungs. This is really a form of natural autotherapy, or so-called autoinoculation. Injection of bacterial substances stimulates the body cells to produce the protective agents.

In case the patient has not sufficient vitality to react, the immunizing substances are not produced and the treatment fails; therefore, the earlier in the disease they are given the better will be the results. They should not be left as a last resort when the individual's vitality is exhausted.

In certain localized infections the body absorbs but little of the products of bacterial growths or antigens. Therefore, the amount of antigen absorbed being small, the amount of active immunity produced is slight. That is, little of the specific opsonins are formed, and those normally present are, to a large extent, used up so that the opsonic index is low and the disease tends to become chronic, or the part infected may be so badly damaged by the severity of the infection that the surrounding tissues are unable to react and form the necessary opsonins. In this case the inoculation of the corresponding bacterial antigen into a part distant from the site of infection where the tissues are injured is followed by an abundant elaboration of the specific opsonins which are delivered to the blood current, are taken to the infected part and reinforce the infected tissues in their fight against the invading bacteria. Again, the whole system may be overwhelmed by general bacterial infection so that the specific opsonins formed and those normally present are rapidly used up. Hence the opsonic index is very low and the body is helpless to resist the infection. Here it has been proved in many cases in human medicine that the subcutaneous injection of carefully graded doses of the corresponding bacterial antigen can increase the specific opsonins. For it is the connective tissues and particularly the loose cellular subcutaneous connective tissues that are, as a rule, the most active in the production on the anti bodies.

Bacterial antigens should *never be given intravenously,* for there they would never increase opsonins. When injected into the body the proper place is in the above described tissues; distant from the focus of the disease and uninjured, they are better able to respond to the stimulus.

Dr. Charles H. Duncan, of this city, has demonstrated that the administration of the crude autogenous pus per os will stimu-

late the manufacture of opsonins and bactericidal substances within the body fluids, as well, if not better, than the injection subcutaneously of autogenous vaccine. He has also shown that subcutaneous injections of the filtrable toxins will also give the same results.

This method of treating infectious diseases, of which he is the originator, has been called by him, and properly too, "autotherapy." The advantages of this treatment over autogenous vaccines at once clearly are manifested. It does away with the preparation of autogenous vaccines which, in addition to being tedious, is also expensive; likewise if this treatment is adopted it will dispense with the present hit and miss stock vaccines that are now in vogue.

There are many strains of each great group of bacteria. Some one has estimated that there are probably as many as seventy different strains of streptococci, and nearly as many different strains of the colon group, etc., so in using a stock vaccine it is readily seen what a small chance there is of getting the same strain of bacteria as the one causing the infection.

Many infections are mixed, and one is unable to determine which is the principal offending organism in order to administer a corresponding stock vaccine. But an autogenous antigen is obtained by the administration of the crude discharge, either in the mouth, or injections subcutaneously of the filtered toxins, enzymes, etc., of the discharge.

This is a natural vaccine and in giving it by these methods we are applying artificial autoinoculation which is the secret of the cure of infectious diseases.

My best results have been confined principally in cases of infections due to pyogenic bacteria, but its application promises to cover a large field of infections, and, that primarily, is the reason of my presenting the subject after such a limited experience with it, so as to enable others to determine to their satisfaction its efficacy in the treatment of infectious diseases in the horse.

In the light of our present knowledge of the defensive forces of the body fluids, any criticism of this method as crude, is un-

justifiable. This method is based upon a well-known scientific interpretation of autoinoculation in the spontaneous cure of infectious diseases. The brilliant results that I have witnessed after the application of this treatment has made me feel that to ignore it in pyogenic infections would be nothing short of criminal neglect on my part.

We may assist in bringing about a natural cure, or, in other words, specific antibodies may be developed, by direct inoculation, or by placing the autogenous toxic substances, developed during the course of the disease, directly into healthy tissues. This is the autotherapeutic method of cure.

Duncan's definition of autotherapy is: *That therapy which employs all of the autogenous nascent, toxic substances developed during the course of the disease against which the tissues react in a curative manner.*

The reaction against these toxic substances is the reaction against the disease.

When the infecting agents have been changed by growing in a *culture media outside of the body tissues or by time,* their therapeutic *value is lessened in proportion* to the change that takes place in them by the *various processes* which they undergo.

Duncan has proven that in extra-alimentary and extra-pulmonary diseases, if the toxic product of the disease is placed in the mouth it will tend to develop specific anti-bodies, and in intra-alimentary and intra-pulmonary diseases, if the toxic products of the disease be placed in healthy tissues outside of these systems, it will tend to develop specific anti-bodies. It must be remembered that it is healthy tissues that develop specific anti-bodies. It is desirable to autoinoculate in many diseases; just how many, clinical experience alone will tell.

Pus contains all the toxic products of tissue changes, enzymes, ferments, and chemical changes in the protoplasmic molecule, against which the healthy tissues react in a curative manner. Besides *the pus and necrotic tissues being the ideal culture media, they contain the toxic substances derived from the causative bacteria.*

It has been shown when bacteria are in the blood stream (as it is claimed, bacteria have been found there in rheumatism in man), they develop few anti-bodies, but when injected subcutaneously they develop many anti-bodies.

Duncan likens autotherapy to a two-edged sword. It is doubly useful if handled by intelligence, but great harm may be done in the hands of the ignorant and careless. Autotherapy is not a cure-all; neither is any other therapy.

I have administered the crude pus to horses by three different methods.

First Method.—One c.c. to 3 c.c. of pus (necrotic tissue) depending upon the density of the discharge to 20 c.c. or 30 c.c. of water, mixed well in test tube, pass through a bunsen or alcohol flame until the solution begins to show a coagulation or curdling of its contents, then filter through a triple layer of sterile gauze; add one drop of phenol; 1.5 c.c. to 2.5 c.c. of the filtrate would be injected into the loose cellular tissue in the pectoral-axilary region. The dose graded according to the condition of the animal. The second dose not to be given for at least 48 hours, depending upon the clinical symptons of the case; seldom would I administer the second dose in less than four days.

Second Method—One tablespoonful (15 c.c.) of pus (if not enough pus collected can use the necrotic tissue, which is obtainable by scraping the parts), add enough water to make 6 oz. (180 c.c.), mixed throughly, and it is advisable to dispense it in a brown container so that the attendants do not become familiar with the contents. Give 1 oz. (30 c.c.) every hour until four doses are taken. Repeat if necessary the same dosage from three to six days later. In the meantime collect and save as much discharge from the wounds as possible, so as to be provided for future dosage.

Third Method.—One c.c. to 3 c.c. of pus, depending upon its density, to 20 c.c. or 30 c.c. of water, shake well and permit the container to remain at about room temperature for eight to twelve

hours, during that time give it an occasional vigorous shaking. Then place the mixture in a Berkefield filter (No. 3-N-Med).

The filtrate contains only the toxic material of the bacteria and diseased tissues in solution. Our text books tell us that most micro-organisms are endotoxic in character, but the use of the filter shows that the bacteria in the pus mixture permits a large quantity of their toxins to escape.

One c.c. to 2.5 c.c. is the dose to be injected in the above described regions, and to be repeated according to the indications and progress of the case.

The last two methods are according to Dr. Duncan's instructions and are the two I would suggest to be adopted. The first method is unreliable unless great care is exercised in its preparation. If it receives too much heat it is useless and two little heat it is dangerous. Possibly in a water bath for about two hours at a temperature of 60 degrees C. may be a good way to prepare the pus for injecting.

A dose of the autogenous antigen may be followed by a mild "negative phase" lasting hardly over 24 hours to be followed in turn by a "positive phase" extending over several days. A proper sized dose will be followed by the transitory "negative phase" and then the "positive phase," which may last for several days.

The lesions so to speak are flushed with blood and an increased flow of lymph during this moderate "negative phase" when these substances carry a greater quantity of the protective agents of the body fluids, hence healing results.

A dose of autogenous antigen may do damage to an organism that has experienced numerous autoinoculations and is in a condition of constant "negative phase." If administered at all, only in the smallest doses, well diluted, may any help be hoped for in such cases.

Vaccines aid only in cases which have the necessary power to react to their stimulus.

In a hyperplastic area surrounding a suppurating focus, or located in a joint the opsonins and anti-bacterial substances in the

blood do not have free access. Any agency that will increase the local blood supply is indicated.

When the beneficial effects of the first dose or treatment of the autogenous antigen is passing off, then it is time for another dose or treatment.

It is well to remember that as recovery progresses, intervals between the application of the treatment are gradually lengthened.

Most vaccine-therapists have discarded the opsonic count and rely entirely on careful observations of the clinical signs as the indicators for dosage.

The most important point to be remembered is that the earliest application of the vaccine or antigen will give the greatest number of cures, and as their administration does no harm, one should not hesitate even if the septic condition appears insignificant, particularly in our class of patients. If we wait until a pronounced permenent "negative phase" developes and the animal is in a generalized septic state, our results will not be very successful, but nevertheless hope should not be abandoned; the antigen may be administered in a very small, highly diluted doses, at very short intervals.

The recital of case reports are, as a rule, very tiresome and unsatisfactory to the listeners, but I ask you to bear with me for a short time while I relate briefly the results obtained in some cases that covered a wide field of infection.

Case No. 1.—Gray gelding of the draft type, having a large fluctuating fistulous abscess on the right side of the withers. Two doses of the heated pus were administered subcutaneously, the first given on October the 18th, and the second on October the 22d, 1911. The discharge took on a sero-sanguineous aspect the following day after the first injection. The animal made a complete recovery within two weeks. No microscopical examination was made of the discharge.

Case No. 2.—Bay gelding showing a very severe infection of fore point of the fetlock on the off fore leg. Microscopical examination revealed the presence of the necrophorus bacilli, streptococcis and staphylococci. Multiple abscesses were forming

around the joint and extending to the knee. Animal in great pain, places no weight on limb, temperature very high, the condition going rapidly beyond control. Four doses of the heated pus were injected subcutaneously. On December the 10th, 12th, 17th and 24th, 1911, respectively. The improvement was remarkable after the second dose; and the animal was ready for work in a month. Following the second dose the parts were actually bathed with lymph and had the appearance of liquid vaseline.

Case No. 3.—Black gelding having a generalized necrotic and abscess formation around the coronet and in the hollow of the fetlock due to a punctured wound in the frog. Five doses in all of the heated pus were injected, covering a period from December the 21st, 1911, to January the 12th, 1912. After the first dose the parts took on a flushed appearance and began to heal rapidly. Unfortunately the flexer pedis tendon had necrosed before the treatment was begun and had ruptured. Although healing was complete the animal was destroyed. The microscope showed the same infecting agents as case No. 2.

Case No. 4.—Gray gelding. Microscope shows the same micro organisms as in case No. 2, and clinically and etiologically is the same as case No. 3; receiving five injections of heated pus, making a complete recovery in six weeks.

Case No. 5.—Dr. W. J. Magee's case. Bay gelding, showing a profound infection of the off fore foot and large necrotic areas. Microscope showed the smear covered with necrophorus bacilli, streptococci, staphylococci, and what appeared to be the bacilli pyocyaneus. This case was treated with the heated pus and Dr. Magee was very favorably impressed with the results after the first dose, although the animal died. Dr. Magee attributes the death to the too frequent injections, bringing on a permanent "negative phase."

Case No. 6.—Buckskin gelding, the microscope showed a streptococcic infection of a wound on the hind quarters, that had become infected by using the same syringe in injecting it that had been used on a distemper abscess on another horse. This animal at the time of the treatment was in a prolonged "negative phase,"

showing numerous abscesses in different parts of the body. The injection of heated pus in small doses did not influence the course of the disease and the animal died from sepsis.

Case No. 7.—Bay gelding, brewery draft horse, suffering from a nail prick that had caused a separation around the coronet, great pain, high fever, no weight on foot. No microscopical examination of the discharge was made. This case took four doses of the heated pus before recoverey became complete in five weeks.

Case No. 8.—Bay gelding; coronet, pastern and fetlock, one suppurating mass due to a punctured wound in foot. Discharge of purulent synovia from original wound. No microscopical examination made. This case was fed with the purulent discharge from the leg and all the suppurating and necrotic areas began to heal, and parts were perfectly healed in five weeks, except a slight discharge of non-purulent synovia from the bottom of the hoof. All the digital articulations had become ankylosed and the animal was destroyed.

Case No. 9.—Gray gelding, a deep punctured wound reaching down to the coxofemoral articulation; yielded very rapidly to the administration of the crude pus per os.

Case No. 10.—Gray gelding, of a large heavy draft type, cellulitis of the entire right hind leg, apparently starting from a calloused area on the anterior surface of the pastern. The part was washed and hair clipped and a moist antiseptic dressing applied for twenty-four hours. Then the callous was raised off completely and the pure pus caught in a wide mouth bottle. A pure strain of streptococci was shown under the miscroscope. This discharge was filtered through the Berkefeld filter and only two injections were necessary to bring about a cure.

Case No. 11.—Gray mare (green), had been suffering from a very severe attack of influenza of the fulminating type. The attack under the regular treatment ran a very tedious course, until finally the temperature remained stationary at 102 degrees F., pulse 60, and the animal refused to eat or drink and was in this condition for three days, when small petechia appeared in the left nostril; eight distinct petechia were counted. In the right

nostril there was not so many. Along the abdomen were several oedematous patches about the size of a man's fist. The symptoms were undoubtedly those of purpura hemorrhagica in the initial stage. The animal was injected subcutaneously with 2.5 c.c. of the filtrate of the discharge from case No. 10. The next day the condition of the animal was wonderful, temperature normal, petechia and oedematous swellings completely disappeared. Animal drank a pail of water and ate one quart of oats. A second dose was given four days later and the animal made a rapid recovery.

Case No. 12.—Dark gray gelding, having a fistula of the withers of four weeks' standing. The parts were washed with plain tap water and the next morning two tablespoonfuls of pus was collected and enough water added to make 12 oz. of the mixture. One ounce was given in the mouth every hour, until four doses were taken. By mistake the same number of doses were administered the next day but without any harm being done. The day following the first treatment, the discharge had changed to a decided bloody serous exudation and about two drams was all that could be expressed from the fistulas tract; the second day only a few bubbles of the discharge could be forced out, in comparison to the two ounces on the morning on which the treatment was commenced. The animal made complete recovery in three weeks. No miscroscopical examination was made of this discharge. Four treatments were all that was necessary in this case.

Concluding Remarks.—Strong antiseptic and astringent solutions are contraindicated, as a rule, when the autogenous antigen is being used, because such agents retard the outflow of lymph and blood which follows their use. Lymphogogues may be used in the place of such solutions. Sod. chloride four per cent. and sod. citrate one per cent. in boiled water is a good lymphogogue.

Generally speaking the more severe the systemic infection the smaller should be the dose of antigen employed. Where very small doses are given, they may be given more often; in some cases daily minute doses being employed. When large doses are given the intervals between them should be lengthened. Finally

too much should not be expected from this treatment and it must not be considered as a cure-all.

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THE ANNUAL MIDSUMMER MEETING OF THE ILLINOIS STATE VETERINARY MEDICAL ASSOCIATION will be held at the State Farm, Springfield, July 9. A very enjoyable and profitable gathering is anticipated, and from what we have seen of Illinois meetings, will be realized.

THE MINNESOTA STATE VETERINARY ASSOCIATION will hold its next meeting at Minneapolis, July 10 and 11. The success of the meetings of this association are assured in advance, as its members are interested and active, and its secretary thoroughly alive to its every requirement.

THE VETERINARY MEDICAL ASSOCIATION OF NEW JERSEY will hold its mid-summer meeting at the Columbian Club, 441 Jersey Avenue, Jersey City, on Thursday, July 11. There will be three sessions; morning, devoted to clinic; afternoon and evening sessions devoted to reading and discussion of papers. Clinical material is said to be in abundance, and this feature of the meeting promises to be better than usual. Secretary Loblein has set about to make this a banner meeting, and thirty days prior to its date was in a position to announce the following names of gentlemen who will contribute to the literary programme: Drs. P. K. Nichols, Staten Island; H. E. Stearns, Arlington, N. J.; James McDonough, Montclair, N. J.; John V. Laddey, Newark, N. J.; Thos. B. Rogers, Woodbury, N. J.; Chas. E. Clayton, W. Reid Blair and David W. Cochran, New York City. Others will be added later. A general invitation was extended to the members of the Veterinary Medical Association of New York City to attend the meeting by Dr. J. T. Glennen, Newark, at the June meeting of the New York City Association, and we predict the attendance of a large percentage of them.

THE PENNSYLVANIA STATE BOARD OF VETERINARY MEDICAL EXAMINERS, ITS WORK AND ITS NEEDS.*

By Jacob Helmer, D.V.S., Scranton, Pa.

In the development of veterinary medicine and surgery, animal hygiene, meat and milk inspection, protective sanitary legislation, and in the enforcement of laws governing veterinary practice, Pennsylvania ranks second to no other state, and along a few lines of progress she stands alone in the foreground.

Thirty years ago, graduated veterinary surgeons were few and were to be found almost wholly in large cities and towns. Opportunities for veterinary education at that time were few and the college curriculum very deficient.

In 1882 a few practitioners in Philadelphia met and formed a corporate society known as the State Veterinary Medical Association, and thus began the organization of the profession in Pennsylvania. Subsequently, the Keystone Association was formed and county organizations in the more thickly populated sections throughout the state. Simultaneously with this progress, new veterinary schools began to make their appearance, the veterinary department of the University having been established in 1883. At that time the title of Veterinary Surgeon was comparatively little used, although the title of V.S. or D.V.S. was given by the few veterinary schools then in operation. A man who treated animals was among laymen generally known as a Horse Doctor. While this is true to-day, yet it is much less so, and the change began with the introduction of laws calculated to govern and protect the profession and practice of veterinary medicine and surgery.

To organize the profession and to pass laws to safeguard and protect all its interests was the first work of the State Association. In other words, to define who should and who should not

* Read before the Pennsylvania State Veterinary Medical Association, Philadelphia, March, 1912.

be allowed to practice. It is true that at that time there were regular practitioners, non-graduates, men who had learned the art from practice supplemented by such scanty literature as it was their good fortune to find, and it is also true that there were many who made a part of their living by practice and many more who helped their neighbors in a community, generally without any remuneration.

In proceeding to pass suitable protective legislation, it soon became evident, and it was perfectly natural, that there should be two interested parties, one the party of graduates entering the field, the other the party of those who had honestly practiced the profession and secured a livelihood by it. Evidently it would have been unjust, even had it been possible, to obtain protective legislation without including the latter class of veterinary surgeons. As a result of a compromise, these were allowed to use the title of veterinary surgeon or analogous title, providing they had gained from it a livelihood for five years previous to the passage of the first Act, namely in 1889. This law is known as the law of 1889.

The next important step was to provide for registration of all men in the state legally entitled to register, and a registration book of record was placed with the prothonotary of every county. At this juncture a startling condition appeared. No sooner was it generally known that men could register as veterinary surgeons than many, without any such qualifications as were demanded, presented themselves and succeeded in registering on their personal affidavits. After a period of nine months the registration books were supposed to be closed, but in some counties no regard was paid to this by the prothonotary, the fee was taken and the applicant registered as before. But, in some instances, registration being refused, some applicants through political power succeeded in having the books reopened for a short period, and this opening and closing of the books continued until 1905, when the State Board was formed and registration placed wholly in its power and discretion on the fulfillment of certain fixed conditions.

It is evident that the creation of a State Board at this time was natural and was wholly the result of necessity because up to this time protective legislation had proven a farce, since hundreds of illegal registrations appeared upon the books. To prohibit illegal registration was, however, only one of the functions of the Board. Its work was to take a higher and a wider range. It was vested with legal power to conduct the examination of graduates as to their qualifications in stated branches, to pass upon diplomas and to require a three instead of a two-year veterinary course, to issue a license, to attach the seal of the state, to record licenses and to keep a book of registration containing the names of all legal practitioners. Incidentally, State Boards like this have influence to raise the standard of veterinary education throughout the country, to cause the adoption of better college curriculums and more thorough instruction in the branches taught, and to regulate the moving of practitioners from state to state. It has the opportunity of becoming acquainted with every practitioner in the commonwealth and to enlist his interest and co-operation. In other words, to unify the profession in spirit and aim, thus making it a ready power to act as a unit against things inimical to its interests or to promote general welfare. Unity in a profession is a great power, and we could have bestowed upon us no greater blessings than unity and harmony. Our Board voices the sentiments of the profession; is its attorney and labors uniformly for its elevation. Its work (unless abnormal) is wholly of a constructive character, and it is a bulwark of the profession.

The number of State Boards is rapidly increasing. One by one the states are falling in line. Each state adopting such a course does something tangible to better veterinary education. Eventually graduates from all schools must compete for a license. Naturally State Boards are anxious to protect the profession and by mutual agreement between them the good of the profession will not be difficult.

Thus State Boards are a powerful factor in all questions of

educational growth and legislation affecting the future of the veterinary profession in the state and nation.

The scope and usefulness of the veterinary profession is not sufficiently comprehended even by the majority of veterinarians. It presents a vast field for observation, experiment and discovery. The intimate relation of this branch of medicine to the larger live stock and dairy interests of this country; to the science of the production of improved breeds in all classes of the domestic animals, the study of foods and feeding to secure better results; the problem of the production of force and the conservation of energy in all classes of draught animals; the care of the domestic animals in health and disease; the study of the control and eradication of contagious and infectious plagues so destructive to animal life and property; the fact that certain animal diseases are communicable to the human family and that diseases may be spread through the medium of meat and milk; the question of the cleanliness of animal food products, as well as their freedom from disease taint; the problem of the production of the best quality of animal food calculated to nourish and sustain human life; the contribution the veterinary profession is capable of making to solve the problem of the production of higher grade and more intelligent animals either for work or to afford pleasure, make plain the question why the existence and proper enforcement of wholesome laws to protect this important field of observation and work are a paramount necessity.

The State Board of Veterinary Medical Examiners of Pennsylvania was organized nearly seventeen years ago. Has it accomplished anything? Institutions, like individuals, either go forward or backward. The moment no advancement is made the law of retrogression begins to assert itself.

The Board has uniformly and conscientiously, during all these years, fulfilled the duties for which it was created. It has been aggressive and enforced the law without fear or favor. It has won difficult cases in the courts and obtained legal decisions on obscure points that tend to render more clear the meaning of the law, recognizing it as sound in principle and

practice and establishing it upon a permanent basis. These laws have not been altered or changed, but the scope of their usefulness has been extended. The recent re-registration act of 1909 is a notable example of such extension. It is a credit to the profession that among other things the re-registration act furnished the Board with sinews of war and made it possible to accomplish what could not have been done without this aid. Pecuniary aid from the State of Pennsylvania Veterinary Medical Association has always been a compliment to the Board and a guarantee that you fully believed in its efficiency.

The Board has found from year to year a larger number of graduates presenting themselves for examination and to receive the license to practice in the state. It has prepared a directory containing the names of all the legally qualified practitioners, and in this directory, among other matters of interest, are all the laws as they were enacted from time to time, governing the practice of veterinary medicine and surgery in Pennsylvania.

The Board, through its Secretary, has conducted extensive correspondence with complainants and also those complained of as law-breakers. Suits against the latter have been instituted and pushed as rapidly as circumstances and means would permit.

The Board found itself at times in trying conditions, and if it has erred (for to err is human) it has been a mistake of the head rather than of the heart.

It is not at this time my purpose to eulogize the Board, but to point to the fact that in its work it has not been a mutual admiration society but a potent force to fulfill the responsibilities placed in its hands. In this connection it would be natural to infer that as our laws become older the necessity of enforcing them against illegal practitioners will become less and less. But the above is more true of the human medical profession than of the veterinary profession. There are yet a number of formidable aspirants knocking at the door for admission under the acts of 1889 and 1891, with whom we have to deal. Then there is a tendency to take the work of dentistry from the domain of veterinary surgery, thus making it a specialty that our present

laws would not reach. But the worst menace is comparatively a new one, viz., the invasion of the field by large numbers of men with correspondence school diplomas. Said diplomas are conferred for any price from ten dollars to fifty dollars, upon any and all applicants who answer printed questions with answers appended. To pass an examination the would-be student answers some of the questions given him without answers appended. The real object of the procedure is to get rich quick, but as there is no guaranteed value received, the scheme is basely fraudulent and an injustice not only to the student but to the public. Under existing protective laws this class of offenders can be easily reached and punished. Thus the work of prosecution of illegal practitioners is as much a necessity to-day as it was seventeen years ago and demonstrates that the profession cannot yet dispense with the active services of its Board of Veterinary Medical Examiners.

It is pertinent here to inquire whether the laws governing the practice of veterinary medicine and surgery in Pennsylvania can be reasonably modified or improved for the benefit of the profession. In section 9 of the laws of 1895 the power to prosecute is placed wholly in the hands of the Board. The Board shall be the prosecutor in each case. It has been suggested that any person concerned throughout the state should also be permitted to be a prosecutor. It is believed that this would lighten the burden of the Board in the matter of prosecution and be an economic factor in obtaining results without the expenditure of much money.

This plausible view, however, may rightly be regarded with more or less suspicion. No doubt the persons who framed that portion of our laws wisely discerned that a new law enforced by the public might be seriously injured or possibly killed by injudicious suits—suits based upon revenge, prejudice or hearsay. It appeared to the law-makers that more dignity would inure to the good of the profession if the State Board was prosecutor and that the effect of the prosecution would be more far-reaching. We cannot refrain from commending this view and

entertaining serious doubts as to the final success of any other method.

But, while we agree with and commend the law-makers, we feel that we may improve this part of the law by asking that the fines collected become the property of the Board for its use in prosecutions. Just at this time we would not advocate tampering with these laws but to seek their enforcement, except efforts as just stated, for the purpose of obtaining further financial help to promote the work of the Board. Further than this, and on the same lines, we would advocate making a powerful appeal in a proper manner and at the proper time, to the legislature of Pennsylvania for an annual appropriation of say five thousand dollars to defray the necessary expenses of the Board. It is quite certain that we would receive some substantial assistance, even though not the amount asked for. The appointment of an intelligent committee, including the State Veterinarian and others in position of influence, they backed by the profession of the state, bringing influence to bear upon all the legislators, would bring results.

When rightly considered, it is the right of this profession to ask for such necessary aid from the state, and we should not be timid, having in view the public good. We are members of the same family and children of the great state of Pennsylvania. Its law-makers are not our enemies but our friends. We placed them there, and we have a right to ask them, and they in turn fully appreciate their positions as public servants in this respect; moreover, they can readily understand the nature and necessity of such a request, and many of them, if not the majority, have such interests as ours at heart. Probably one-half of our legislators are from country districts. We have no right to complain of what our legislators have done for us because they have done so well. As proof, think of all the laws of the State Live Stock Sanitary Board, of a laboratory of substantial aid for a veterinary department in connection with the University of Pennsylvania, of the milk laws of years ago and the perfection of them ever since, of the progress of the question of pure milk in the

cities and towns and the country districts of our state, of the laws for the inspection of meat and meat products and the establishment of better and cleaner butcher shops and cleaner meat shops throughout the state. Remember the supreme effort made by a state to stamp out a recent plague introduced from across the sea.

When you stop to consider the conflicting opinions and the difficulties to be overcome you cannot form any other conclusion but that the representatives and senators, as a rule, have for years in Pennsylvania had our interests at heart and have done for us all in their power, and if they have not done more it may be our own fault. Personally, I feel grateful, and say all honor to them.

We have heard so much against politics and politicians. We have witnessed the conflict in the struggle for power of parties. Condemnation on every hand. But if you can show that no substantial gain has been made, then all the progress our profession (based upon legislation) has achieved is a myth and has no real existence, then as far as we are concerned it is possible that parties have been a detriment and an injury to us and to the states. But if we can point with just pride to our achievements assisted by the law-makers of Pennsylvania, then it follows that parties, so called, have not been a detriment to our profession.

The truth is, however, that in a democratic form of government, like ours, you can achieve nothing outside of politics. The Pennsylvania State Board of Veterinary Medical Examiners has recently in a way been reconstructed. Two members, the only politicians on the Board, have at the expiration of their terms been removed and two others appointed by the Governor to fill their places. This is not the first and only time such action has been taken in this state in similar matters or in any other state of the Union. Therefore, the action was not without precedent and was no doubt based upon a good reason. An unbridled tongue maketh enemies. This quotation to-day is as true as it was in the days of King Solomon.

I would not raise the question here were it not for an editorial

that appeared in the February number of the AMERICAN VETERINARY REVIEW entitled "Pennsylvania Points the Way," which editorial reflects unmistakably upon the character of the present Board.

By it the writer of the article has demeaned himself. He may, however, be deemed less culpable, possibly not knowing the facts. Nevertheless it appears that at least he assumed to know, nor did he hesitate to reflect discredit upon the Governor, the legislators, the State Board and the profession by saying "that a tottering political machine required more pliant men that sinister political influences might be better served." The language of the writer is not to be likened to the beaded bubbles that sparkle on the rim of the cup of justice and truth, but, on the contrary, it is an untrue and unwarranted stricture upon the character of the chief executive of Pennsylvania, upon our legislators and your Board of Veterinary Medical Examiners. Thoroughly considered, it appears to be wholly the morbid vaporing of a deluded mind, based upon an article in the same number of the REVIEW entitled "A Letter to Governor Tener."

It would be a sign of innate weakness if the Board did not resent all such base insinuations. If our manhood, self-respect and political independence are to be preserved by such sophistry, Heaven help us.

If the above statement quoted from the editorial be true, then it is the immediate duty of the Board, recognizing the fact, to request its own dissolution.

Let me assure you, however, that the Board as to-day constituted is at least as good a Board as ever. Among other advantages, it will be less hampered in its deliberative functions by a similar bossism that the article first endeavors to create and then pretends to condemn. We emphatically do not share in the view that our chief executive and the men who place laws upon our statute books do not desire that said laws be enforced against law-breakers, and from our past experience we know that the Board will be sustained in the reasonable and just enforcement of these laws.

If other boards in other states have failed, the fact may not be necessarily due to bad politics but to the incompetency of any such board. One principle of the Pennsylvania State Board in the past has been to enforce the laws governing veterinary practice, more especially where no reasonable doubt exists in the premises, and in this attitude no doubt the present Board, as in the past, will be sustained by all right-thinking men. Further, the interests of the profession so far as they lie in the jurisdiction of the Board will be duly conserved and protected, and the profession as far as possible made a unit of strength for the promotion of its own interests and the related interests of the public.

In conclusion, the Board needs the continued support of the profession. It is plain that to prosecute offenders requires funds. I am confident that if we do not misbehave by foolishly calling our friends bouncers, killers and the like, with necessary and well-directed effort we can obtain state aid. This question the Association should pass upon to-day.

I trust that no serious harm has been done through unwise, as well as unjust criticisms that can possibly have but one effect, except in the broadest minds, viz., to stimulate indifference and antagonism. Sentiments destructive of the objects for which we have so long and so faithfully labored are not worthy of any. We therefore deprecate all expressions of personal feeling antagonistic to the state government where the interests of the entire profession are so deeply involved.

THE COLORADO VETERINARY MEDICAL ASSOCIATION held its semi-annual meeting at Fort Collins, May 31 and June 1. A large programme was enacted, and the gathering was a successful one. The secretary's report will appear in a subsequent issue.

DR. N. S. MAYO OF THE VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG, started June 15 for a trip to Costa Rica, Panama, Puerto Rico, San Domingo, Jamaica and Cuba to study live stock and agricultural conditions and especially transmissible diseases of animals of those countries.

HOG CHOLERA.*

By C. D. McGilvray, M.D.V., Winnipeg, Man.

This serious affection of swine has fortunately only made its appearance on rare occasions in Manitoba. Dunbar reported an outbreak which occurred at Kildonan during 1886 and Stevenson an outbreak near Carman in 1899. Since the latter time it has not made its appearance here until August, 1911, when it was reported to be in existence among pigs on premises near Winnipeg.

Upon investigation it was found that the outbreak was of a rather serious nature and existed on premises and in districts where a large number of swine were being kept.

Efforts were therefore immediately directed towards controlling and eradicating the disease from the districts in which it existed and at the same time to ascertain and determine the source of infection.

Searching enquiry failed to bring forth any evidence or information as to the infection having been introduced by fresh hogs brought into the district and no fresh hogs had for some considerable time prior to the detection of the outbreak been introduced onto any of the premises on which the disease first manifested itself. A curious and striking feature was that on all of the premises where the disease first manifested itself, the hogs thereon were being fed uncooked swill, kitchen refuse and garbage obtained from hotels in the city of Winnipeg, while on other premises in the same district, where they were not feeding such refuse and garbage, the hogs remained healthy and the disease did not manifest itself until a much later date and after ample time had elapsed for them to become affected either by direct or indirect contact or intermediary means from the premises where the disease already existed, and in such cases information was obtainable that the infection had been introduced by such means.

* Presented to the Veterinary Medical Association of Manitoba, Brandon, March, 1912.

† Rutherford, in his report for 1910, refers to the possibility of outbreaks of hog cholera being started in suburban districts among swine being fed on uncooked garbage, and our experience and observations in connection with the recent outbreaks of hog cholera dealt with, indicate and support the theory as to fresh outbreaks originating from such a source.

While the outbreaks dealt with by us in the district surrounding Winnipeg furnished strong circumstantial evidence in support of this theory, yet outbreaks at Kenora furnished even more striking illustration and convincing proof thereof.

During October last some disease was reported as causing the loss of a number of hogs on the premises of a Mr. H.—— at Kenora and upon investigation it was found that the owner of these hogs conducted a hotel at Kenora and that the hogs were being fed on the swill and kitchen refuse from the hotel. The symptoms manifested by these hogs, as well as the post-mortem lesions, were characteristic of hog cholera. No fresh hogs had been introduced on to the premises in question for a period of one year prior to the time of the outbreak. Hogs were also found to be affected on the premises of three other owners, which were separated from each other by several miles, and upon each of which the swine were being fed uncooked swill and kitchen refuse obtained from hotels in Kenora. The disease manifested itself on all of these premises almost simultaneously without any possibility of the infection being introduced either by contact or intermediate means from each other's premises.

On two other premises in the same district hog cholera was subsequently found to be in existence, but the infection in these cases was directly traceable to the introduction on to the premises of hogs which were obtained from one of the parties already referred to.

On further examination of all hogs on premises in the vicinity of Kenora, which were kept under observation and inspected at intervals covering a period of over three months, it was shown

† See page 18 in the report of the Veterinary Director General for the year ending March 31, 1911.

that the disease was only found affecting hogs which were being fed on uncooked kitchen refuse and garbage or on premises where garbage fed hogs had been introduced.

Summing up the outbreak at Kenora, on four premises 146 hogs were found to be affected and slaughtered and on each of these premises the only information obtainable as to the source of infection was to the effect that they had been feeding uncooked swill or kitchen refuse obtained from certain hotels. On two other premises, on which the disease was found to be in existence among 17 hogs, the source of infection was traceable to there having been introduced on to the premises hogs which had been obtained from one of the parties whose hogs were being fed on uncooked hotel swill. The hogs which were thus obtained and introduced being the first to show evidence of the disease and the history obtained was that the other hogs on the premises had been entirely healthy until coming into contact with the ones referred to.

Hogs were inspected at 13 other premises in the Kenora district, the hogs on which, however, had not been fed uncooked swill or kitchen refuse and these remained entirely healthy although kept under close observation for a period of over three months. Needless to state that during this period due precautions were exercised to prevent any possible infection being introduced from other infected premises.

Regarding the outbreaks in the districts surrounding Winnipeg, out experiences were very similar to those at Kenora. The disease appeared and manifested itself on premises on which the hogs were being fed uncooked swill or kitchen refuse and then spread from such centers to other premises in the same district.

In connection with the outbreak of hog cholera at Winnipeg, which was of large extent and a rather serious nature, we found the disease to be in existence on 62 premises and it was necessary to slaughter 2,219 swine either diseased or close contacts with diseased pigs. We also visited an additional 212 premises and inspected thereon 2,190 pigs, which were kept under observation and inspected at intervals extending for a period of over three months.

The question may arise in some minds as to why uncooked kitchen refuse and garbage may give rise to the disease. In this connection it was quite often found by us that hotel kitchen refuse and garbage which was being fed to hogs contained quantities of pork products (especially sausage and pork cuttings). It also came to our notice that coincident with the appearance of this outbreak, large quantities of pork products from the United States had been imported into Winnipeg and that a distribution of these pork products was made to certain other districts, viz., Kenora, Port Arthur and Fort William, and that shortly after the distribution of these products there followed, almost simultaneously, at each of these districts outbreaks of hog cholera, and it would therefore appear quite probable that the meats in question had been infected.

The result of our investigations and inquiries, therefore, furnished very strong circumstantial evidence in support of the belief that many fresh outbreaks of hog cholera are started in suburban districts by feeding uncooked kitchen refuse and garbage containing pork or pork products to swine.

Moore, of Cornell, refers to a serious affection other than hog cholera occurring among swine as the result of them being fed on kitchen refuse containing certain alkalies. However, while kitchen refuse containing certain alkalies may no doubt be the cause of serious affections and losses among pigs, these alkalies could not have been the cause of the losses occurring among the pigs in the cases referred to, as when hogs were introduced on to other premises, coming from any of these upon which this hotel swill was being fed, fresh outbreaks were started; showing that the disease was essentially of a contagious nature. Again on all premises which we kept under observation, where the hogs were being fed uncooked swill or kitchen refuse, sooner or later, the disease made its appearance and subsequently outbreaks occurred on other premises in close proximity.

The disease having, in all likelihood, been introduced by this means, and involving premises over a considerable area, widely separated from each other, centers of infection were set up in many districts and serious outbreaks followed thereafter.

Once the outbreaks became manifest, the infection was spread in many and varied ways. Among the possible means by which the infection was conveyed from place to place, which came under our notice, were: By direct contact, that is, diseased or contact hogs having been introduced from some of the other premises, or by the premises being in close proximity to each other. Evidences were found of the possibility of the infection having been carried by means of dogs and where suspicion of this was aroused, steps were taken to prevent it. It was also brought to our notice that certain birds, especially crows and pigeons, appears to be responsible in spreading the disease from place to place. Suspicion was also aroused in many cases as to the infection having been introduced onto premises by the feet of visitors and others. Again, suspicion was also aroused as to the disease being carried in small streams which infected other premises through which the same stream had its course and on which piggeries were located.

The disease, in the outbreaks in question, appeared in both the acute and chronic types. At the beginning of the outbreaks the acute type was the most in evidence and was more marked in severity, becoming less so with the lapse of time and approach of winter. This depended no doubt upon the virulence of type or strain of infection, which appeared to become weakened or attenuated with the lapse of time.

In the acute type the symptoms observed were, sluggishness; capricious appetite; gumming or adhesions of the eye-lids; accellerated breathing, associated with cough in some cases; the appearance of reddened or purplish blotches on the skin especially round the region of the ears and neck, the under surface of the abdomen and the inner thighs. The bowels, in some cases, were constipated, while in others diarrhœa was present. Progressive weakness, uncertain gait, terminating in loss of power of hind limbs, was frequently noticeable. In the acute cases, affected animals rapidly succumbed to the disease. Hogs ranging in age from two to six months seemed to be more severely affected and more rapidly succumbed to the disease than those older.

In chronic cases the same symptoms were in evidence, although less pronounced and the course of the disease more prolonged with progressive weakness and emaciation supervening. Post-mortem lesions were chiefly in evidence affecting the lymphatic glands, lungs, heart, kidneys, spleen and intestines. The lymphatic glands were usually observed to be markedly reddened and enlarged; the lungs showed many small ecchymosis and large pneumonic areas, dark red in color, consolidated and sharply defined from the healthy lung. Ecchymosis was also observed on the heart surface. The kidneys were darker in color than normal and presented numerous petechia (the turkey egg appearance). The spleen in many cases was greatly enlarged, although in a few cases it also appeared smaller than normal. The intestines in acute cases, where the duration of the disease had been short, petechia and ecchymosis were noticed on the outer surface and on the inner surface areas of the mucosæ often appeared congested, inflamed and more or less swollen.

In chronic cases somewhat similar lesions were observed as those in acute cases, together with characteristic ulcerations of the intestines, noticeably round the region of the ileo-ceacal valve, as well also as thickening of the mucosæ in other parts of the intestines.

While formerly the specific cause of hog cholera was thought to be due to the bacillus suis, it has in recent years been demonstrated by Dorset and others that this germ only plays the part of an associated or secondary invader and the true infective agent has not been demonstrated, but is due to a filterable virus which is ultramicroscopic, so that at present there is no means of determining the diagnosis of hog cholera, other than by the characteristic symptoms and post-mortem lesions and its infectiveness or contagiousness to other hogs which can be proved by the transmission of the blood from infected to healthy animals as well also as by the placing of diseased animals in contact with healthy pigs which sooner or later contract and develop the disease.

Meeting place A. V. M. A., Das Deutsche Haus, Indianapolis, August 26 to 30.

THE VETERINARIAN AS A PUBLIC HEALTH OFFICER.

By A. T. Kinsley, M.S., D.V.S., Kansas City, Mo.

The conservation of the health of the people is a problem that seriously concerns the undivided attention of the best talent in every civilized nation. The progress of a nation is dependent upon the health of its people, and the intellectual attainments of the general population indicates fairly well the condition of health that is maintained by the inhabitants of the country. In other words, education of the public is pre-requisite in the establishment of effectual sanitary regulations, and the enforcement and maintenance of efficient sanitary laws is dependent upon competent, industrious public health officers. The existing state of the health of the general public of any community, commonwealth or nation depends upon the wholesomeness of the food supply and the control of the dissemination of the various disease producing micro-organisms. The efficiency of a health official depends primarily upon his knowledge of the nature of foods and infective diseases.

The evolution of the sanitarian from the old time medicine man through the petty political stage to the present scientific standard has been comparatively slow, and it is possible that there are some unqualified officers still in charge of responsible positions. Before discussing the question of efficiency of veterinarians for public health officers, it is advisable to have an understanding of the qualifications of a veterinarian. In order that a veterinarian be eligible to the position of inspector in the Bureau of Animal Industry, of the U. S. Department of Agriculture, he must be a graduate of a college that gives a definite course of study prescribed by the Department of Agriculture. All such colleges maintain a curriculum that includes courses of pathology, bacteriology, meat inspection, milk and dairy inspection, quarantine and hygiene, subjects that are of especial

importance to sanitarians, in addition to thorough courses in anatomy, physiology, medicine and surgery and the related collateral sciences. Men that complete such a course are equipped with the technical knowledge that is essential for a general health officer.

The efficiency of a man is determined by his accomplishments. The veterinarians employed by the B. A. I. inspected the carcasses of 49,179,057 animals from June 30, 1910, to July 1, 1911, and their inspection was sufficiently efficient that these meat foods were accepted as import products in practically all foreign countries. During that time 113,742 entire carcasses were condemned, as well as 874,211 parts of carcasses. In addition, 19,000,000 pounds of meat and meat food products were condemned as unwholesome and unfit for human food. The significance of the extent of these condemnations in the maintenance of the health of the consumer of meat food products cannot be overestimated. Many diseases and diseased conditions are of frequent occurrence in the carcasses of animals that are slaughtered for food. Thus it is a well known fact that the flesh of animals that have been slaughtered at the time or shortly after they were affected with high temperature is unfit for food, because of the production of chemical substances that are injurious to the health and sometimes disastrous to life.

Less than one-half of the meats and meat food products slaughtered in the United States is subjected to government inspection. Much of the meat is killed by the butcher in the smaller cities, towns and villages, and is not inspected. Some provision should be made for the supervision of the small town slaughter houses and the inspection of the animals killed therein by a competent health officer.

Some second class and many first class cities have a force of veterinarians who devote all or a part of their time in inspecting slaughter houses and meat food products of the butcher shop. These officials frequently condemn carcasses or parts of carcasses as being unwholesome and unfit for food, and it is seldom that butchers and meat dealers dispose of any meat or products

thereof as being unwholesome and unfit for food unless it is officially condemned; however, these dealers should not be censured for not detecting spoiled foods or diseased flesh, as recognition of such conditions, at least in many instances, is possible only by one skilled in this particular line.

Aside from meat inspection duties, veterinary employees of the Bureau of Animal Industry have, in co-operation with state authorities, successfully eradicated the Margarapus Annulatus, the fever tick, from 57,520 square miles of infested territory during the last year. They have also diminished the infested area of scabies of cattle by 50,000 square miles and the infested area of scabies of sheep by 390,000 square miles. Other Bureau veterinarians have safeguarded the live stock industry of the United States from the importation into our country of such diseases as Surra, Rinderpest and foot and mouth disease, which is of no small financial concern to the animal husbandry of our country.

Many veterinarians employed as sanitary officers for the various states in the Union have accomplished much in the preservation of the health of animals of their respective states and indirectly of the people. Other veterinarians have rendered efficient sanitary service to many towns and cities in the capacity of milk and meat inspectors. The principal benefits obtained by city milk and meat inspection have been in the betterment of sanitary conditions and the maintenance of health of the human. No small part of the health in general of the live stock of the United States and indirectly of the health of the people, should be attributed to the ever watchful local veterinary practitioner who efficiently safeguards his community from the ravages of such diseases as cow pox, anthrax and rabies.

There are many diseases of the lower animals that are common also to the human, and the veterinarian is certainly best qualified to identify these diseases in the animal and to properly quarantine, destroy, disinfect and prevent the spread of such diseases to man. About 150,000 humans die annually in the United States of tuberculosis. That tuberculosis is transmissible

to man from lower animals is now an accepted fact by practically every one. The New York Board of Health, in a recent report, states that a large percentage of infant tuberculosis and that about 2 per cent. of adult tuberculosis is of bovine origin. It has been further shown that about 10 per cent. of articular tuberculosis of the human is also of bovine origin. Milk sickness, a disease primarily of cattle, and which is also transmissible to man, made its appearance in New Mexico three years ago. Malta fever, a disease of goats, transmissible to the human, is very common to the countries bordering the Mediterranean Sea, and this disease, according to report, has recently been identified in Texas.

The medium through which the human obtains the infective micro-organisms causing tuberculosis, milk sickness and Malto fever is invariably milk. The prevention of the transmission of these diseases to man is dependent upon the identification of tuberculosis or milk sickness in cattle and Malto fever in goats and the prohibition of the use of milk from any animal affected with any one of the above diseases; the establishment of a proper quarantine; and the final disposition of the diseased animals or carcasses and disinfection of the premises. A man capable of tuberculin testing cattle and interpreting the results, and capable of diagnosing milk sickness and Malto fever in the milk supplying animals, is alone efficient as a milk and dairy inspector.

Rabies is a disease common to the domestic animal and man, and is readily transmissible by means of the saliva and other secretions. Anthrax is another disease that affects practically all mammals, the infection of which is readily transferred from animal to animal through wound inoculations and possibly also by milk. Cow pox and foot and mouth disease are diseases of animals that are capable of being transmitted to man through milk. The above named diseases, being common to the domestic animals, are diagnosed and efficiently controlled by one versed in comparative pathology, that is, a veterinarian.

Milk and dairy products are now extensively used as human food, in fact, from one-fifth to one-sixth of the food consumed

by the people of the United States is derived from the dairy cow. There is probably no one who has a knowledge of milk, the source of its contamination, the changes which it undergoes after leaving the animal, better than the veterinarian. It is found that milk is frequently a carrier of diseases infective to man only. Milk borne typhoid fever is credited with about 100,000 cases of this disease annually in the United States, of which fifteen to twenty thousand die. Scarlet fever and diphtheria are easily and frequently transmissible through milk. Through milk borne endemics these two diseases are paying a heavy death toll annually. The great loss of human life in the United States to-day is due to dysenteric disturbances of babies, caused by impure or unwholesome milk.

It must not be understood that the veterinarian alone should be responsible for the preservation of health of the public. The various phases in which the veterinarian is and should be a factor have been briefly discussed, but the conservation of the health can be brought to the highest standard only by the co-operation of the physician and the veterinarian. Each has his field, although they essentially overlap. For example, when the physician finds any cases of Malto fever, infantile intestinal tuberculosis, or other diseases that may be milk borne, he should consult the veterinarian and obtain his co-operation in determining the source of the infection and thus prevent further extension of the disease. On the other hand, if the veterinarian finds rabies, or other diseases transmissible to the human, prevalent in any of the domestic animals, he should consult with the physician and advise as to the best means for prevention of infection in the human. Such freedom of consultation will be of untold benefit, and, if carried on as suggested, it will be the cause of establishing a new standard of health.

In summarizing, it is very evident that the veterinarian is naturally the most efficient of sanitarians, in the maintenance of health of the domestic animal. It has been further shown that many of the diseases of animals also affect the human, and in view of the fact that there are many human diseases and diseased

conditions that have their origin in the dômestic animal or in the products of these animals, it seems self-evident that veterinarians should continue to act in the capacity of health officers, especially as meat and milk inspectors, and every well regulated board of health should have one or more veterinary members.

A PRELIMINARY REPORT ON THE ACTION OF CHINA BERRIES, LEAVES AND BLOOMS ON PIGS.

By C. A. Cary, Auburn, Alabama.

It is quite commonly accepted in the South that china berries have an anthelmintic effect on animals and children. The negroes give china berries to their children for intestinal worms. Some of the farmers give them to stock, especially horses and mules, for the same purpose. It has also been reported that robins and some other birds which eat the berries become intoxicated and often fall to the ground from the tree and remain intoxicated for sometime. These reports led me to make some tests. So far we have tested the action of china berries, leaves and blooms on pigs. The following are the results of the preliminary test:

1. The berries, leaves and blooms all produce intoxication in pigs.

2. Somewhat prolonged feeding of the berries will produce distinct fatty degeneration of the kidneys and liver.

There are other changes, but these are the most prominent.

The annual banquet and ball of the Division of Veterinary Medicine of the Colorado State Agricultural College was held in Masonic Temple, Ft. Collins, Colo., June 1, 1912. There were 105 present.

The Animal News, published in the interest of the New York Women's League for Animals, is a little monthly destined to do considerable toward making people kinder to animals. The subscription price is $1.00 a year and the publication office is No. 26 West 40th Street, New York. The reading of this little book each month will do your soul good, and incidentally your dollar will assist in the relief of some suffering animal.

AN INVESTIGATION OF AN OUTBREAK OF SEPTICAEMIA IN POULTRY.

By R. A. Whiting, D.V.M., Associate in Animal Pathology, Purdue University Agricultural Experiment Station, Lafayette, Ind.

The history of this outbreak of septicaemia hemorrhagica is as follows: My attention was drawn to the outbreak by the receipt of the carcasses of a chicken and a turkey accompanied by a letter from the owner giving the following information: He had recently lost a cow from a highly acute disease. The symptoms given by the owner were as follows: high body temperature, nervous symptoms such as frothing at the mouth, drawing the neck to one side, partial paralysis and later there was labored breathing and diarrhœa. At about the same time that the diarrhœa set in, the cow layed down and was unable to get up, gradually becoming depressed, then comatose and died in 48 hours from the onset of the disease. The carcass was removed to the rear of the hog pasture and left exposed for the hogs to feed upon which they did to the extent of engorgement. The following day all of the hogs were slightly indisposed and did not eat their regular ration and exhibited a profuse diarrhœa which persisted for several days. In the meantime they were continually eating portions of the beef carcass of which small undigested portions were present in the diarrhœal discharge. No deaths occurred among the hogs, although they ate nearly all of the carcass.

Chickens and turkeys were allowed the freedom of the front portion of the hog pasture which contained hog feeding troughs and shelters. They were seen to feed upon the fresh hog manure which contained the undigested portions of the beef carcass. Several of the chickens and turkeys were found dead within a few hours after they were noticed feeding in the hog lots. Some appeared stupid and died in from 20 minutes to an hour after

their condition was noticed. Later the disease seemed to assume a more chronic course, with deaths resulting in from one to several days after the first symptoms were noted. The affected birds seemed stupid or dejected. In most cases there was complete loss of appetite. Diarrhœa was common in all, at first scanty and later profuse and yellow. A few segregated themselves from the flock. All became weak and droopy, most of them lying down wherever they happened to be, and staggered when attempting to move. They gradually became weaker and then comatose, with death occurring while perched on roosts, lying on the ground or while in a droopy standing position. The mortality was about 90 per cent., the disease running unchecked until nearly the entire flock, consisting of 70 chickens and 12 turkeys, died. The post mortem lesions in the turkey and chicken were those of septicæmia hemorrhagica.

Microscopic Examinations—Examinations made of blood smears and hanging drops from the hearts of the chicken and turkey revealed the presence of motile and non-motile bacteria, varying in length from 1 u to 2 u. The examinations made from the livers disclosed the presence of several varieties of bacteria, as decomposition had set in. Agar plates were then inoculated with the heart blood and the organisms isolated in pure cultures and identified. The motile organism, owing to its ability to coagulate milk with the production of acid, and produce a profuse growth and fermentation of lactose-litmus agar, was designated as a variety of B. coli communis. The non-motile organisms belonged to the bacterium septicæmia hemorrhagica group. It showed bipolar staining and produced a faint membraneous growth upon bouillon which later became turbid, especially in the lower portions of the test tube. No change occurred when grown in litmus milk. The growth upon agar was slow, and upon lactose-litmus agar the growth was slightly alkaline and without the production of gas. All culture media was standardized.

Pathogenesis—Pure cultures of each organism were then injected subcutaneously into rabbits with the following results:

Those receiving B. coli communis became sick, but recovered. Those receiving the bacterium became sick and died in from 12 to 16 hours. An exposure check died in 36 hours. The lesions observed were those of septicæmia. A pure culture of the organism was recovered from the heart blood of the inoculated rabbits and injected into chickens, producing death in from 28 to 48 hours. The lesions present in these experimental animals were also characteristic of septicæmia hemorrhagica. Pullets that were inoculated subcutaneously with a pure culture of the bacterium from the hearts of the chicken and turkey died in from 16 to 21 hours, with lesions of hemorrhagic septicæmia. A pure culture of the bacterium was recovered from the hearts of the inoculated pullets and injected subcutaneously into old hens, producing death in from 22 to 36 hours. Mixed cultures of the bacterium and B. coli communis were then injected subcutaneously into an old hen, producing death in less than 16 hours. A young pullet exposed to the inoculated birds died in 6 days. A hen exposed under the same conditions remained well.

The cultures used varied in age from the fourth to the twelfth generations and were grown at a temperature of 37 degrees C. The subcutaneous injections consisted of doses of 1 cc. of a 24-hour bouillon culture. The virulence of the bacterium for chickens was apparently decreased to some extent after passage through the rabbit and to some extent after passage through fowls, and the virulence seemed to be increased by the addition of B. coli communis to the bacterium. Such a mixed culture produced death in from 12 to 16 hours even in old individuals. were identical both morphologically and culturally with the cultures first isolated from the hearts of the original chicken and turkey.

The symptoms in the rabbits consisted of uneasiness, fever, drowsiness and coma. The pullets and hens first appeared stupid, later becoming drowsy with loss of appetite. Diarrhœa then set in, at first slight, gradually becoming more profuse, watery and of yellowish color. As soon as the diarrhœa began the birds

became very weak, death occurring soon afterward while in a comatose condition.

Morbid Anatomy—The lesions observed in the experimental animals consisted of congestion of the mucosae and skin, this being especially well marked in the combs of the pullets and hens, and petechial hemorrhages in the pericardium, endocardium pleurae, lungs, liver, spleen, kidneys, intestines and peritoneum. The liver was usually the seat of numerous pin point white foci. These contained necrotic cells, which stained faintly or not at all, puss cells and numerous bacteria of the variety in question. The lesions present in the lungs of the pullets and hens were œdematous as well as hemorrhagic.

Dr. LeMay of Ft. D. A. Russell attended the recent semi-annual meeting of the Colorado State Veterinary Medical Association held at Ft. Collins, Colo.

Acknowledgments.—Announcement for the 28th annual session School of Veterinary Medicine, University of Pennsylvania, 1912-13, and of the New York State Veterinary College, 1912-13, Kansas City Veterinary College Quarterly, March, 1912, the Agricultural Journal of the Union of South Africa, Bulletin 145, U. S. Dept. of Agr., Bureau of Animal Industry, Trypanosonia Americanum (a common Blood Parasite of American Cattle), by Howard Crawley, Zoological Division, Farmers' Bulletin No. 480, U. S. Dept. Agr., Practical Methods of Disinfecting Stables, by George W. Pope, Vet. Insp., Quarantine Div., B. A. I.; Bulletin 29, Rabies and Its Control in New York State, by John G. Wills, Chief Veterinarian, New State Dept. of Agr.; Circular 196, U. S. Dept. Agr., B. A. I., Some Results of Cattle-Tick Eradication, by A. D. Melvin, Chief B. A. I.; Tenth Annual Report of the Director of the Bureau of Science, by Paul C. Freer, Director, Manila; the Philippine Journal of Science, the Philippine Agricultural Review, Veterinary Notes, Parke, Davis & Co., Detroit, the Cornell Veterinarian, Proceedings Indiana Veterinary Medical Association, Notes on Trapezium in the Equidæ, by S. H. Chubb, Am. Museum of Nat. Hist., New York, N. Y.

TWO EVILS.

By Herman Gross, *Senior Student McKillip Veterinary College.

Two evils that beset the veterinary profession are the correspondence schools, "diploma mills," and the patent medicines. The influence and effect of these on the public could be greatly nullified by some little effort on the part of each ethical member of the profession. There is no reason on earth why these correspondence schools could not be compelled to shut down sooner or later.

From this source a lot of quackery is bred, it makes a lot of people think that the veterinary profession is an easy one to learn and altogether creates a false impression in the public mind. They produce law breakers; many a "sucker" has sent off his money and got the course and "diploma" thinking that the possession of the latter made him a qualified practitioner and as a result got in trouble sooner or later.

Some even consider themselves capable of passing a State Board examination and apply for it as has occurred in Minnesota, Nebraska, etc. It can all be summed up that these "mills" are detrimental to the profession, not that their "graduates" can be said to be competitors of regular graduates, but because of the false impression they create on the public mind.

Therefore something should be done, and can be done, if gone about in the right manner; and something that every live veterinarian can add his little assistance to.

These schools advertise mostly in farm journals and to some extent in other popular magazines; and in any journal wherein their advertisements are found we can write the publisher and ask them to discontinue accepting any advertisements of these schools.

* The author has received his degree in veterinary medicine since writing this article, and is practising his profession in Webster, S. D.

If a clear and expressive letter is written there is no question but that a sound-minded publisher will give the matter due consideration. I took it upon myself to write the *Farm, Stock and Home* in regard to the matter, with the result that I have not seen any of these advertisements in that paper since, and have now written the *Dakota Farmer,* asking them to further decline such advertising and have no doubt in my mind but that they will do so.

If every veterinarian would write one letter to any paper that carries these advertisements, a lot of good could be accomplished.

Now, to our second evil, the patent medicines. These, along medical lines, have been well exposed of late years, but there is a line of veterinary proprietaries that ought to be exposed for the benefit of the profession.

These, same as the diploma mills, are pretenders upon the public mind and are deceptive, to say the least about them; they, nearly all of them, depend upon the glib and untruthful advertisements as bait to get the public's money.

There is also a class of pretenders, imposers upon the public mind, as the individual of " Anti-abortion serum," fame of Wisconsin, that the veterinary profession should know all about.

The American Medical Association maintains a department for the analysis and exposure of all proprietary preparations, the result of which is published in the journal of the association, and I believe that the A. V. M. A. could do something along similar lines.

The services of a good analytical chemist could be obtained to analyze as many of these preparations as the association would decide upon to have examined.

I believe that it would be money well spent and the benefit derived from it would be far greater than the expense involved.

The " stunts " and " cures " made by some of these remedies could almost make a man lose his faith in all materia medica and therapeutics taught at college. To illustrate absurdity of statements made by some of these medicine men a few examples are given here.

"'*Jointine.*' This is a positive cure for joint ill, blood poison and leakage of navel in colts and is guaranteed to cure or money refunded."

"'*Visio.*' A remedy for moon blindness (Ophthalmia), cataract and conjunctivitis. 'Visio' will convince any horse owner that it is a good remedy for defects of the eye irrespective of the length of time the animal has been afflicted. No matter how many doctors have tried and failed, use 'Visio' under our guarantee to refund money if it does not cure."

"'*Mack's* $1,000 *Spavin Remedy.*' Must cure or your money back. We guarantee to cure your horse of bone or bog spavin, ringbone, thoroughpin, curb, capped hock, shoe boil, spring knee, lacerated and ruptured tendons, sweeny and all other forms of lameness.

"Mack's $1,000 Spavin Remedy goes right to the source of trouble and quickly restores natural, healthy conditions in the bones, muscles and tendons of your horse."

Here is the best one of all, our troubles in diagnosis of lameness are all vanished by the use of it.

"'*Tuttle's Elixir.*' Locates lameness. Simply bathe the limbs with Tuttle's Elixir, then watch for the little water blisters.

"That's where the horse is lame. Where there is no lameness, the Elixir will dry out like water."

This is enough to show the rank statements made by the dope makers and it is by these untruthful representations that they get the money from the public, who think they are getting much more for their money this way than if they consulted a veterinarian for his honest opinion or advice.

But so it is, as it ever will be as Barnum said, "The American people wants to be humbugged," and this will continue as long as there is a sucker born every minute.

These two evils as here presented have an effect on the profession that can be modified if united efforts are made in that respect.

I trust that these few lines may stimulate the opinion of a few at least, and whatever is done will be for the good of all.

THE INTRA-DERMAL TEST FOR TUBERCULOSIS.

By Fred W. Porter, D.V.M., Tampa, Fla.

It has recently been my privilege to apply the intra-dermal test for tuberculous cattle, for the first time officially, in the state of Florida. The opportunity also served to compare the intra-dermal test with the subcutaneous temperature test, under our local conditions. My test was used within a day or two of six weeks after the temperature test had been given.

Some years ago, 1906 to 1908, acting under an ordinance of the city of Tampa, I tested by the old method some 3,500 head of dairy cattle, supplying milk and dairy products to this city. I did not then consider that test as good, owing to its being subject to so many variations; still my results were fairly satisfactory, as I was enabled to reduce the per cent. of reactors from 50 per cent. to about 9 per cent. From 1908 up to a few months ago nothing was done. Consequently conditions had gotten back to about their original standing.

In this locality our dairy cattle are never stabled except at the time of milking; this usually occurs between 11 and 2 o'clock midday and at the same hours at night. This means, that in order to use the temperature reactions, the cattle must be kept under abnormal conditions for from 48 to 72 hours. This of itself will produce a rise in temperature. Then, during the late winter, spring and early summer months we have the virulent tick to contend with, and even our native, immune cattle will very often carry an abnormal temperature at this season, so that true, tuberculin reading cannot be had. Again, a high milker, in the full period of lactation, will very often carry a temperature of 104 degrees F. during a few hours of one of our hot afternoons. Late pregnancy or approaching parturition also makes it inadvisable to use the thermal test. None of these conditions affect the intra-dermal test.

My opportunity came when I was called upon to retest sixty

head of dairy cattle that had reacted to the thermal test. The work was done under the direct supervision of the veterinarian for the Florida State Board of Health, who was present by the request of the Mayor of Tampa, and in the presence of the city milk inspector. The intra-dermal test was used by and with the consent of all interested parties.

The accompanying table will show the comparative results of the two tests. The intra-dermal test was made within a day or two of six weeks later than the thermal test. I attribute the apparent variance largely to tick infestation. Even our home cattle, which are practically immune to tick fever, will carry some temperature and show a falling off in condition when our warm weather comes on and the tick becomes virulent. The concentrated tuberculin used was furnished by the Mulford Company, as were the special syringe and needles used. Where reactions were had, they were very pronounced, even a novice would have no difficulty in recognizing them; if there was no reaction, the evidence was just as plain.

These cattle were part of the herd of an Italian dairy and from past experience I expected to be pretty well kicked about. But I found it quite otherwise; of the sixty head, only one was at all restive and she not bad. Whereas, with the inoculation at the shoulder one must look out for a blow from the head, as well as dodge that hind foot that can reach the ear. The advantage of the intra-dermal test to the owner is, that it in nowise disturbs the regular routine of his dairy nor does it excite the cattle by unusual handling. Consequently there is no decrease in output. To the practitioner there is the very much simplified technique, the small number of necessary visits, no thermometer to break and the reactions are to one condition only. Personally, I consider that a very careful physical examination should precede either test.

I had hoped to have obtained the thermal readings of these cattle, as taken when the old method was used, so as to have given the results in tabulated form. This I have been unable to do.

Of the sixty head tested by the intra-dermal method, all of which had reacted to the thermal test, twenty-seven did not react to the intra-dermal test. Of this twenty-seven, six were considered as not clearly marked either way.

Four cattle were posted; two that reacted to both tests, both showed well marked lesions. One of the cattle in which the reaction was not definite also showed visible lesions. One that reacted to the thermal but not to the intra-dermal test; nothing to be seen or felt and nothing found under the microscope. The microscopic examination was carried out at the laboratory of the State Board of Health.

Dr. R. C. Moore and wife of Kansas City are journeying through the west and enjoying a well-earned vacation, Dr. Moore feeling quite at liberty to do so, particularly since he has disposed of his practice interests to Dr. J. V. Lacroix.

The Kansas City Veterinary College Bulletin, Number 35, has been received, containing an account of the commencement exercises which took place on the evening of April 11. Dr. Tait Butler, prominent in veterinary circles and editor of *"The Progressive Farmer,"* Memphis, Tenn., delivered the commencement address, the quality of which needs no mention, as all who know Dr. Butler and have heard him speak know that his utterances are always both interesting and filled with wisdom. We therefore congratulate the graduating class in having him address them. The degree of Doctor of Veterinary Medicine was then conferred by President Moore, accompanied by a splendid address, in which he outlined to them their duties to themselves, to their profession, and to the public, recommending to each as a guide in all cases and at all times the Golden Rule.

Dr. E. J. Johnston responded in behalf of his class, and finally Dean Stewart addressed the 130 graduates with his characteristic earnestness. The bulletin contains in addition an account of the meeting of Missouri Valley Veterinary Medical Association, held in Kansas City, January 30 to February 2, a report of the secretary of the Y. M. C. A., alumni notes, etc., and is altogether interesting.

REPORTS OF CASES.

A CASE OF VENTRAL HERNIA.

By C. A. Cary, Dean of Veterinary College of Alabama Polytechnic Institute, Auburn, Ala.

On November 30, 1909, a sorrel mare 12-14 years old came to the free clinic of the veterinary medical college of Alabama Polytechnic Institute. Three to four weeks previous to this time she received an injury a little to the left of median line, just back of umbilicus six or seven inches. A very large hernia appeared, the swelling covering almost the entire abdomen. This hernia presented some of the symptoms of a rupture of the pre-pubic tendon. The teats were advanced, the back swayed, the anus was pulled forward, and the immense enlargement indicated pre-pubic hernia. But there was no edema around it. For diagnostic purposes the mare was thrown and turned upon her back, and an attempt at reduction was made without success. Pushing the mobile contents of the skin and sack to one side, the abdominal wall could be felt along the borders of the rib cartilages and also at the pubic border; but the visible movements of the flanks during inspiration and expiration led one to believe that the pre-pubic tendon was not broken loose and that the rent was not large. Rectal examination also proved that the pre-pubic tendon was intact.

This mare was given one ounce of chloral hydrate at 1 p. m.; at 2.30, mare was cast, given chloroform, turned upon her back, abdomen cleaned and an opening through the skin and tunica near the injury-mark was made. Some three gallons of serum escaped. The hernial opening was 7 to 8 inches long and parallel with the rectus muscle fibres. A portion of the small intestine, the caecum and floating colon were in the hernial sack. These were replaced. The edges of hernial opening were pared away to produce raw fresh surfaces; then the edges were brought together with No. 19 silk thread, using interrupted sutures. The large fold of skin was left intact, and the skin opening was closed with interrupted silk sutures, leaving a small place for drainage. The mare was helped up, and a broad cotton pack was placed over the region of the rupture and over this a broad abdomen

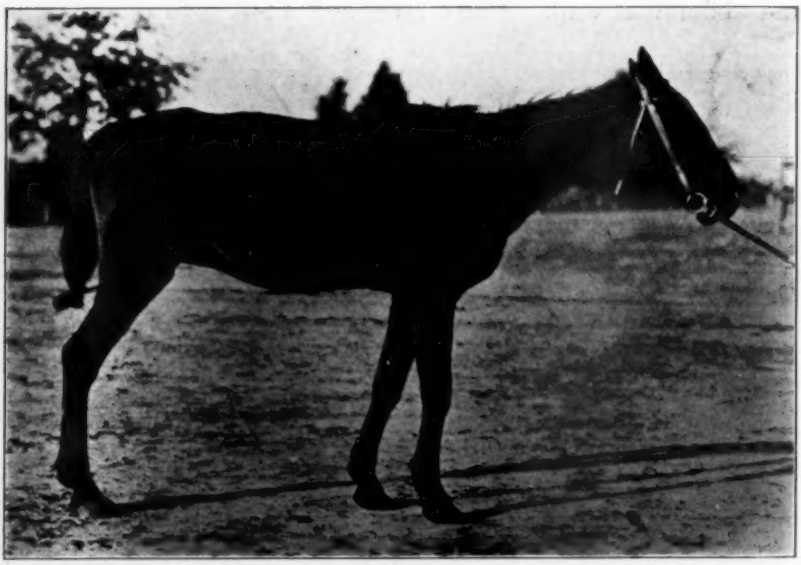
bandage applied, having the digital ends tied over the back. Rather profuse suppuration from the drainage opening in the skin occurred for four weeks. The external stitches were removed and the fistulous opening cleansed with antiseptics daily for 5 to 6 weeks. Then the mare was given the run of a large pasture paddock. In about 3 months after this the mare was spayed through the vagina. At the time of spaying I could feel no adhesions between the intestines or between the intestines and abdominal wall. There remained a small fistulous opening

BEFORE

(6 to 8 inches in front of the place where the hernial opening had been stitched) for two and one-half years. About two years after the operation two or three fistulous openings appeared directly over the deep stitches, and April 18, 1912, I cut down on the place where the old hernial opening was located and removed the No. 19 silk thread sutures. This place soon healed. A long fistulous track ran back toward the mammary glands; yet the glands were not involved.

On May 7, 1912, the mare was destroyed, and the scar at the hernia was found to be firm, strong and very solid. The connective tissue fibres ran obliquely across the old opening, and

it would have been more difficult to tear the abdominal wall at the place of the scar than in any other part of the abdominal wall. There were 4 to 5 radiating star-like scars on the peritoneal surface of the cercum, 3 of the same on the large colon and some 3 to 4 on the messentery of the small intestine; but, surprising as it may seem, there was not a single inflammatory adhesion or false union of any of the peritoneal surfaces. There



AFTER

were a few small white flakes on the surface of the liver. The remarkable points of interest are:

1. The healing or rapid union of the freshened surfaces of the hernial borders following the operation.

2. The firm, fibrous, untearable cicatrix.

3. The long retention (2½ years) of the silk sutures without any indication of absorption; yet some continual suppuration around them.

4. No peritoneal adhesion; all scars free and smooth.

5. The scars where the large ovaries were removed were not larger than a pea and were also smooth.

When aseptic conditions may be secured and maintained the following method of operation may be employed: Separate the

hernia sack from the skin by dissection or otherwise, and if the hernial opening is very small, twist the sack and suture just over or through the borders of the opening. If the hernial opening is two or more inches long, it will be necessary to open the sack, pare away the glistening smooth borders of the hernial opening and suture with sterile catgut. Now cut away one side of the sack or as much as may be required of the sack on one side and pull the other side or part of the sack (that is still attached to one side or border of the hernial opening) and stitch to the muscle or fascia, using sterile catgut. This should form a close and tight fitting flap, covering the hernia. Next bring the skin lips together; cover with aseptic or antiseptic packing and then apply broad bandages. Leave the bandage and dressing on for several days if no suppuration is present. If suppuration is anticipated, gauze drainage bands or tacks should be inserted before the skin is closed, and the parts should be dressed every day. Sometimes it is remarkable how much suppuration can be present in some cases in the healing of the hernial wound and the animal make a good recovery.

TRACHEAL PLASTIC OPERATION OR MAKING AN ALUMINUM WINDPIPE FOR A HORSE.

By H. M. Stevenson, V.S., Perry, Iowa.

In presenting this item to the readers of the Review, I will depart from the old form "I am not writing this with the expectation of presenting anything new," for I hope to present something new in two particulars: 1st, the operation; 2d, the result after time enough has elapsed to judge the same.

In naming this operation "Tracheal Plastic" I had in mind a similar operation in the cranium, "Cranial Plastic." So far as I am aware, there is no literature on the former operation.

Subject—A Hambletonian stallion, with a mark of 2.08¼ when a four-year-old, owned by Dr. R. E. Doidge of Perry, Iowa.

During the season when it was a four-year-old, it had a bad case of distemper, and to relieve it the operation of tracheotomy was performed by a veterinarian whose work was not of the best, as he opened the trachea about 10 cc. and in healing it collapsed, so that it was difficult for him to breathe.

Operation—After scrubbing and shaving the field of opera-

tion, it was painted with tincture of iodine, after which a solution of cocaine (4 per cent.) and adrenalin (1-4000) was injected, an incision about 18 cc. long was made and the trachea opened up in the old wound fully 10 cc. long.

Previously an aluminum tube 12½ cc. long and 4⅛ cc. in diameter, with perforations near the edge as shown in cut, had been made, which was inserted in such a manner that the upper

end extended above the first tracheal ring that was collapsed, as also below the first good ring.

The cartilaginous rings that were collapsed were brought over the aluminum tube and stitched fast with silver wire, passing through perforations in metal tube and over cartilages alternately.

The tissues were then brought together and stitched with uninterrupted catgut sutures, and the skin stitched with interrupted sutures and a dry dressing applied.

The operation was performed without the use of any holding

appliances except the halter, which was fastened to either side of the stall and to the beam above, the horse remaining on its feet throughout the ordeal and suffering no pain.

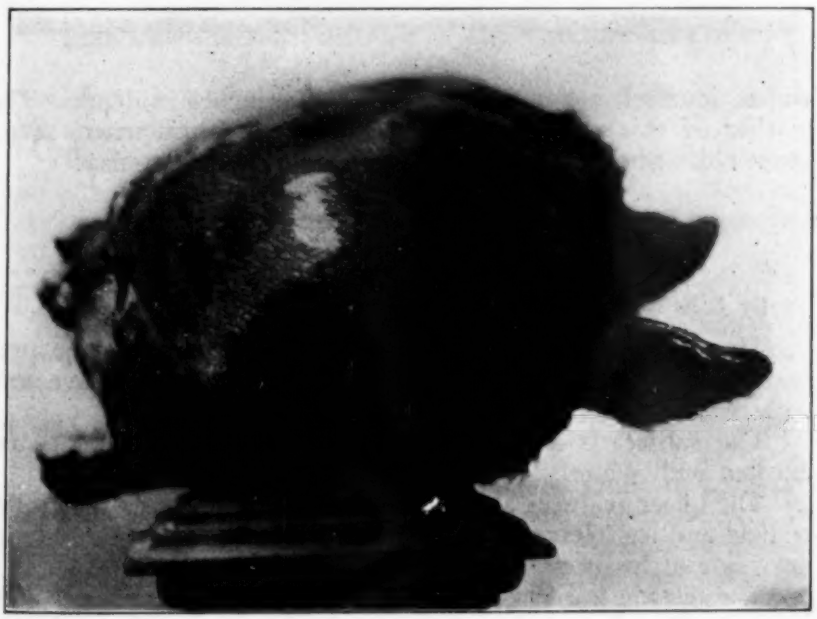
P. S. June 5—The stallion is making an uneventful recovery, this being the twelfth day; has not missed a meal; feels fine; has perfect use of neck (very little swelling); wound about half closed up, very little suppuration outside. There was some odor on his breath for two or three days, but it has cleared up now.

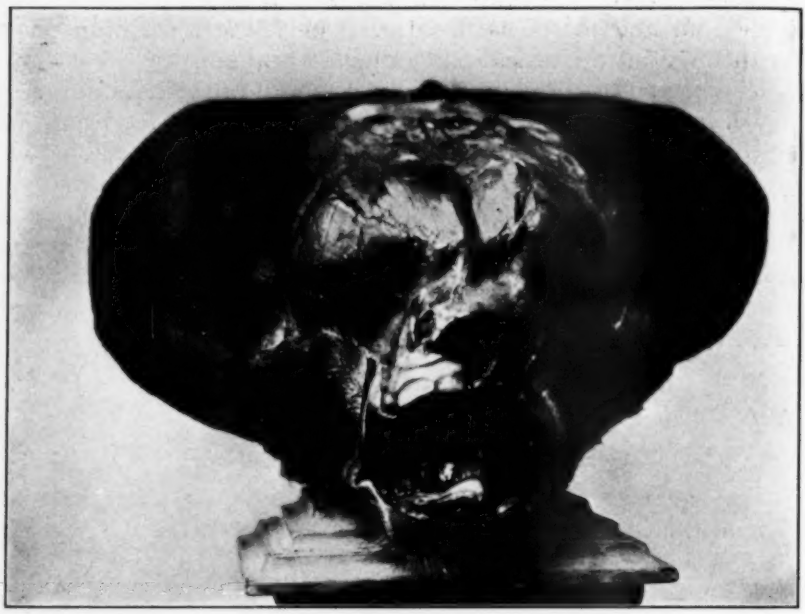
P. S. June 16—Twenty-three days after operation the wound is practically healed (only about one inch left), very little pus or swelling, and the horse has been driven without any discomfort; in fact, seemed to enjoy it, as he gets plenty of air.

HYDROCEPHALUS.

By H. J. Coggins, D.V.M., Ilo, Idaho.

On April 23, 1912, I was called to attend a mare in labor. I found the case very complicated; but after two hours was successful in delivering the foal, everything being normal, with the exception of the head, which measured seventeen inches in





width, fourteen inches in length and nine inches in depth. The mother of this colt is a standard-bred Percheron mare, seven years old. She is in good health and working every day.

AN INTERESTING CONDITION.

By J. E. Aghion, V.S., Veterinarian State Domains, Sakha, Egypt.

The accompanying photograph which I here produce presents somewhat of a remarkable condition, which I have met with twice in practice.

The subject is a four-year-old bull, dark bay in color, but marked with white.

The queer features about him is that he has got a full-grown testicle and leg (left post-leg) attached to the upper part of the near side of his neck.

The testicle is enclosed in a layer of skin (covered with thin hair), unlike that of the scrotum, which is soft, thin and generally black in color; it looks more like a layer of common skin.

The leg springs from above the testicle, passing over it down-

wards; it constitutes a femur, patella (both atrophied or very small in size compared to other parts of the same leg); the tibia, fibula, tarsus, metatarsus are normal, also the first, second and third phalanx; the third phalanx is enclosed in one claw instead of two as usual.

I may here mention that this bull was presented to me for

castration (not the abnormal testicle mentioned above, but his two other real testicles!).

The owner, a show-man, presented to me a couple of years ago a bull of nearly the same description for castration, only that one had a pair of testicles on his neck, body of a goat and two small legs attached to it.

THE vacancy on the Missouri State Board of Examiners has been filled by the appointment of Dr. D. B. Morgan, of Neosho. The Doctor is a man of wide experience and doubtless will prove a very efficient member of this Board.

A THREE-TOED HORSE 6,000,000 YEARS OLD: In a clipping from the *Evansville* (Ind.) *Courier* of June 16 (courtesy of Dr. Ferguson) we read of the discovery of the skeleton of a three-toed horse 6,000,000 years old, in the shale fields on the desert, 28 miles east of Mina, Nevada, the announcement being the result of the explorations of Prof. Lawrence Baker, of the Department of Geological Research of the University of California. We are reminded of how young and immature we are.

ABSTRACTS FROM EXCHANGES.

ENGLISH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

TETANUS IN A BULL [*H. C. Ganguly, G. B. V. C.*].—Well nourished gray bull had been castrated by the mulling (?) method, and was suffering with tetanus. Very tympanitic, with a temperature of 99 degrees F. the animal breathed laboriously, his eyes were prominent, back arched with slight protrusion of the head and neck. The gait was straddling. The mulled testicles were highly inflammed, red, hard and painful. There were a few deep abrasions of the skin. These symptoms had been present for a week or ten days. The testicular region opened with an incision, let out a great amount of sero-bloody discharge and the tissues within were degenerated and sloughing. Thorough carbolic disinfectants were resorted to. Soon, however, all the muscles of the body were stiff—violent twitchings and tremblings took place. The membrana nictitans protruded. The jaws were locked. The temperature varied between 101 degrees and 102 degrees F. Rectal injection gave some temporary relief, but death occurred three days later, after a continual attack of convulsions which lasted two hours.—(*Veter. News.*)

OESOPHAGOTOMY IN A DOG [*H. C. Ganguli, Jr.*].—A retriever while eating its meal of rice and meat suddenly stops, and since makes frequent attempts to vomit. The next day there is a swelling in the throat. The dog is dull, howled and has the throat surrounded with œdematous infiltration. What is the cause of the obstruction, is found by oesophagotomy, which was performed in the usual way with the animal under the influence of anesthetics. When the oesophagus was slit open, instead of finding ingested matter, a corroded suture needle about 2 inches long, with a thread about a foot and one-half attached was found lying in the lumen of the oesophagus, with the point commencing to pierce its way through. The wounds of the oesophagus were closed with fine silk for the mucous and with catgut for the

muscular coat. The skin was closed with silk. Recovery was uneventful.—(*Vet. Record.*)

RECOVERY OF FOLLICULAR MANGE [*F. Morton Wallis, M. R. C. V. S.*].—The author obtained excellent result in a chronic case of this troublesome disease by the dressing of the skin with the following lotion: Acid sulphurosi, 2 drachms; chlorid. zinc, 80 grains; water, 8 ounces. This is applied after shaving of the skin, thorough cleaning with soap and water. When any of the putules breaks up, a solid stick of silver nitrate is thoroughly applied in the hole.—(*Vet. Journ.*)

ATRESIA OF THE VULVA IN A BITCH *Prof. G. H. Wooldridge, F. R. C. V. S.*].—Fifteen-months-old bitch had a swelling in the perineum. She strains some. The vulval orifice is represented by a small puncture only, which was situated at what would represent the superior commissure of the vulva. A grooved directory is introduced and run down easily for about half an inch. An incision was then made from its lower end to the upper one. Fine sutures were applied on the skin and vulval mucous on each side to prevent the closing of the incision. Rapid recovery followed.—(*Ibid.*)

TORSION OF THE INTESTINE IN A DOG [*H. F. Lewis, M. R. C. V. S.*].—Suspicion of poisoning required the post-mortem of this six-year-old Irish terrior, which was found dead in his kennel. The cause of death proved to be torsion of the small intestine, which was twisted several times upon itself, so much entangled that the use of the scalpel was required to undo it.—(*Ibid.*)

GERSUNY'S WAX OPERATION FOR PROLAPSED RECTUM [*Prof. F. Hobday, F. R. C. V. S.*].—Interesting record of the successful result obtained in a bull bitch two and one-half years old, whose rectum was persistently prolapsed. Under cocaine and adrenalin, after an hypodermic injection of morphia, four pillars of wax were inserted between the mucous and serous coats of the bowel before it was removed. No further trouble occurred and proggressive improved condition continued.—(*Ibid.*)

LARGE HEADED NAILS SWALLOWED BY A DOG [*G. W. D. Sargeant, M. R. C. V. S.*].—Young dachshund had pneumonia. Counter irritant is applied on its sides. In the excitement he picked up a number of nails off the side of his box. Half a

pound of stiff suet pudding followed by an oleaginous purgative relieved it. He made excellent recovery.—(*Ibid.*)

PUS IN THE ANTRUM IN DOG [*Prof. F. Hobday, F. R. C. V. S., and Guy Sutton, F. R. C. V. S.*].—For a long time a Yorkshire terrier had a discharge on the right cheek, just under the eye. Treated, it stopped and returned again. Pus in the antrum was diagnosed, the mouth examined and the last molar was found loose. It was extracted. A probe then passed freely from the fistulous opening on the cheek into the mouth. Recovery followed. As a rule it is the last molar but one which is found the cause of similar trouble, in this case it was the last—a rather unusual anatomical interesting condition, not to be forgotten.—(*Ibid.*)

AN ENORMOUS CHONDROMA OF THE RIGHT FORE LIMB OF A CAT [*Prof. G. H. Wooldridge, F. R. C. V. S.*].—This patient had a growth four or five times as big as a man's fist between the humerus, scapula and chest wall. The lower part of the leg is paralyzed. No treatment was possible and the cat was allowed to die with only palliative treatment. Post-mortem, the foreleg was easily taken off from the body. The mass of the tumor appeared cartilaginous with some spicules of bones. It weighed four pounds, nearly as much as the rest of the body of the cat. The humerus had extensive periostitis with deposits round the upper extremity of the bone and down the anterior face of the shaft, similar condition was found on the upper halves of the radius and ulna, including the oleocranon process. The scapula was also diseased. All the articular surfaces were normal.—(*Vet. Journ.*)

DEMODEX BOVIS [*S. N. Mitter, G. V. C. Beng.*].—A peculiar kind of fever among cattle was reported and the author delegated to investigate. The disease manifested amongst a number of sick animals, was characterized by nodules about the size of a pea, spread well over the body. The temperature run for three or four days before this appearance up to 102 degrees and 103 degrees F. The skin was inflamed and surrounded by hemorrhagic zone. The nodules became purulent and the examination of the pus revealed the presence of a large number of demodex in various phases of development. In this outland 75 per cent. of the cattle were affected. No fatal cases occurred. Locally the disease in

India is known as "Kat Basanta." It is reported to occur in that area every year.

PECULIAR LACERATION OF THE TRACHEAL MUCOUS IN A HORSE [*R. Eaglisham, M. R. C. V. S.*].—A few days after being purchased this five-year-old horse is sick. He has high fever, 107 F., pulse 80, and his ailment is diagnosed broncho pneumonia, for which he is put under treatment. After a few days, while the temperature runs down to 105, he is taken with dyspnea, and roars so loudly that he is heard 30 yards away. Tracheotomy is performed. The finger introduced feels in the trachea a membrane almost blocking the lumen of the wind pipe. The tracheotomy tube introduced had to be taken off as it increased the difficulty in breathing. Gradually the horse grew worse and died the fourteenth day from the beginning of his illness. At the post-mortem "the trachea was found divided throughout its entire length by a transverse septum formed by the mucous membrane on the posterior or upper part of the tube, being torn from the fibro-elastic membrane forced downward." This membrane was red and inflamed, the lungs showed lesions of pneumonia.—(*Veter. Record.*)

FRENCH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

FEMORO-TIBIAL ARTHRITIS AND FEMORAL OSTEOMYELITIS [*Capt. C. Lesbie, Army Veterinarian*].—A fourteen-year-old horse received a kick on the internal face of the left shank. There is a little wound on the superior extremity of the tibia with swelling running up to the left stifle joint. The horse is very lame. A wide blister is applied and the wound dressed with iodine. The leg is, however, the seat of lancinating pains, which do not subside, although repeated counter-irritation is applied, and yet the swelling has diminished and the wound healed. There is a very painful exostosis of the upper epiphysis of the tibia. Hot brick applications seem to give some relief. The wasting of the muscles of the leg is very marked and electricity applied. Notwithstanding all, the condition of the animal grew worse, and finally he was sold to a butcher.

Post-mortem revealed extensive lesions of osteitis, of arthritis and osteo-myelitis. The superior extremity of the tibia was covered with osteophytes. In the femoro-tibial joint, although there was no effusion, there were extensive lesions involving the tibia,

the menisci and the patella. The synovia was thick and rosy in color. A longitudinal section of the femur exposed handsome lesions of osteomyelitis.—(*Bullet. de la Soc. des Sc. Vet. de Lyon.*)

TRAUMATIC ARTHRITIS OF THE RIGHT ANTERIOR FETLOCK [*Mr. Bel, Army Veterinarian*].—*Fulton,* a six-year-old horse, breaks loose from his picket, runs away and when caught has a wound on the external face of the right fore fetlock, which produces great lameness. This is disinfected with peroxide, dressed with iodine tinct., and a wadding dressing applied. The next day great swelling of the parts which are hot and painful, synovia escapes freely. Slings and blistering of the fetlock. Solution of hermophenyl 10 p. 1,000 is injected twice a day. Hydrophile wadding dressing. Same condition for a few days and the temperature goes up 39 degrees C. Cold water irrigations are used. As fever keeps going high (40 degrees C.) baths of cresyled water are used instead of the irrigations and injections of hermophenyl done three times a day. After a few days as there is no improvement, a pencil of hermophenyl in the fistulous tract is added to the injections. Soon the synovial escape is arrested by formation of a clot, the fever subsides and the improvement sets in. Recovery followed afterwards without trouble.—(*Ibid.*)

CURIOUS CASE OF DYSPHAGIA IN A DOG [*Mr. D. Bonnigal*].—Returning from a walk a dog is taken with violent spells of sneezing and he constantly rubs his nose with his paws as if anxious to remove a foreign body. He remains in that condition for three days and then refuses all kinds of food. He has no fever, no discharge from the nose, the sneezing is gone but the dog refuses to eat and it is with great pain that he is made to swallow some spoonfuls of milk. The mouth is carefully examined and seems to present nothing abnormal except a small yellowish body which seems to push its way into the cavity. Secured with a pair of forceps, it is pulled out. It is a hard bit of straw, 11 centimeters long, which had probably been sniffed up in the nasal cavities, protruded in the pharynx and was sufficient to prevent deglutition. As soon as it was moved, the dog went eating without difficulty.

CHRONIC NEPHRITIS IN A HORSE—DEATH FOLLOWS [*Mr. Rousseau, Army Veterinarian*].—This ten-year-old horse has poor appetite, he looks in poor condition, his droppings are small,

hard and at times a little bloody. He has no fever. Pulse is good, respiration normal—he is taken on treatment as having enteritis. Under proper diet his appetite improves, but is still capricious. Bicarbonate of soda is prescribed. The symptoms seem to subside some, yet his manure remains about the same. The horse eats fairly, but his general condition gets worse. He loses flesh rapidly, stands with his four legs brought under him, the sheath is swollen. Ausculation and percussion are negative. Examination of the urine shows absence of sugar or albumen. While the treatment with the bicarbonate of soda is kept up, malleine as injected, but gives only a negative reaction. Thirty-six hours after this injection the horse is paralyzed behind and finally dies the next day. At the autopsy were found: Small aseitic collection in the abdomen, digestive canal normal, kidneys show the histological lesions of chronic nephritis, bladder congested. In the thorax the lungs are emphysematous, pericardium the seat of pericarditis, heart contains fibrinous clots. Death was due to the intoxication following the injection of malleine.—(*Journ. de Zootech.*)

Mediate Contusion Produces Bursting of the Caecum [*Mr. J. B. Piot-Bey*].—At the start of a race this nine-year-old Arab thoroughbred is violently thrown against a wooden post, on his right side and falls down with his rider. He gets up without trouble and is removed with an ambulance, when he is taken in a box stall. He lays down on the left side, his body is covered with perspiration, breathing is accelerated and loud, reflexes of the cornea are absent. On the right side of the body, near the elbow and the stifle, there are few cutaneous abrasions. The walls of the thorax and of the abdomen are normal, without indications of fracture or muscular ruptures. The horse died a few hours after the accident. The post-mortem revealed the ribs and their cartilages intact, bloody extravasation on the costal and abdominal region. In the abdomen all the organs are extensively congested and food is spread on their surface. The caecum is the site of a wide laceration, beginning about 20 centim. from the front of the organ and large enough to allow the introduction of a hand widely open. It measures over 10 centim. The lungs are normal. The heart is very large but without any apparent lesion.

It is supposed that the caecum more or less full with liquids suddenly burst open upon the enormous pressure of the contusion against the wooden post.—(*Bullet. de la Soc. Cent.*)

PULMONARY NEOPLASM IN A COW WITH SYMPTOMS OF PERICARDITIS BY FOREIGN BODY [*Mr. H. Carre*].—This very old subject presents all the symptoms of traumatic pericarditis. Closer examination reveals besides limited dullness on the precardial region of both sides of the chest, nothing abnormal in the lungs, rough breathing on the left side and mucous râles on the right. Superficial lymphatic glands are swollen, the prescapulars are the size of the fist. Pulse is 72; respiration a little accelerated. Temperature is normal. Tuberculin test is negative. Puncture of the pericardium gives few cubic centimeters of hemorrhagic fluid. Second puncture renewed a few days later is negative. It was only pseudo-pericarditis. A treatment of iodide of potassium was prescribed with Fowler's solution. But death occurred before the effects could be of any value. At the post-mortem, the apex of the right lung was enlarged and covering the trachea, while the left is pushing the heart backward and to the left. The right apex contains neoplasic nodules as big as the fist, rather soft, yellow in color. Two of these are abscesses. The walls of the right auricle has a tumor as big as an apple with the same characters as those of the lungs. Bronchial and oesophageal glands are hypertrophied, contain also small similar nodules. No tuberculosis. Histological examination of the various neoplasms brought out their nature of globofuso-cellular sarcoma.—(*Rev. Gen. de Med. Vet.*)

FATAL DIAPHRAGMATIC HERNIA—SUBACUTE MEGALOSPLENIA [*Dr. Huguier, Army Veterinarian*].—This mare is taken with colic. She is soon covered with abundant cold perspiration. The face is contracted, nostrils dilated, extremities are cold. Visible mucous membranes are pale, pulse imperceptible, respiration accelerated—no alvine evacuation. Diagnostic, internal lesion with hemorrhage. Death takes place half an hour after. All subcutaneous tissues are pale except the muscles which are purplish color. Lungs are bloodless. Heart hypertrophied. Diaphragm has a tearing from the phrenic center to the costal insertions on the left side and the pectoral and abdominal cavities communicate together. Through the rupture, the spleen, the seat of an enormous hypertrophy has passed in the chest and fills up the diaphragmatic laceration. The spleen weighed 14 kilogs., 800 grams. It is gorged with blood forming an enormous magma. The rupture of the diaphragm was with the internal splenic hemorrhage the cause of death. With the exception of a congested condition of the intestines, all the organs were normal.—(*Bullet. de la Soc. Cent.*)

BREEDING PROBLEMS.

The announcement of the Editor of the AMERICAN VETERINARY REVIEW, that he will open a new department in this journal for report and discussion on "Breeding Problems," must be approved and welcomed by every veterinarian of this country.

It constitutes a timely move, and one that will result in cultivating a branch of our profession that has been neglected. We need not censure anyone for this neglect. It resulted from the gradual development and extension of our science and practice, which dates not much further back than a half-century. Going slowly at first, as a new-born profession always does, we had to take hold first of the fundamental branches of medicine and surgery, which called for immediate application and made for a living. One branch of our profession has since been added to another, until the times are now ripe for making the "Breeding Problem" one of our problems; to set about to win "Breeding Work" as a legitimate branch of our American veterinary profession; and to discuss it in our professional journals as we discuss all other subjects that are part of the whole of our science.

In the endeavor to do so, we can well afford to learn some lessons from our European confreres who have since long conquered this field as a distinct part of the domain of veterinary science. It was not without long and strong opposition from those who considered themselves pastmasters of this art that the veterinarians across the Atlantic have firmly established themselves in the realm. Beginning feebly, nearly one hundred years ago, in assisting, advising and supervising the breeding operations of horses for the armies of Europe, they gradually obtained such conspicuous results that opposition ceased, and acknowledgment of the superior ability of the veterinarian in this sphere of work has since come freely from their governments and from the people directly interested. Somewhat later the veterinarians in civil, official positions and the rural practitioners extended their helping hand to the breeding industry of live stock generally, with nearly equally good results, so that to-day we find in European countries not only veterinarians with office and titles of "director of government studs," but also many others who function as "inspectors or supervisors of live-stock breeding."

When we consider that all these positions were originally occupied by men of social and official prominence; that, for instance, the directors of government breeding studs had been, for generations, retired generals of the army belonging to the high, landed aristocracy of the country; and that the study of the theories of breeding and its practice as an art had been the vested privilege of the agriculturist of means for thousands of years, as history attests; then we can fully realize the great victory won by our foreign confreres, and can survey the field that is open to us in this country to extend our usefulness and earn acknowledgment and reward.

In trying to make "breeding work" a success, we must realize from the start that there are some differences in the standpoints on breeding questions between the farmer-breeder and the veterinarian. Breeders, unless they are wealthy fanciers and can afford costly experiments, look upon this industry more from the economic and commercial standpoint; they are influenced by local views and conditions and partial to their breeding stock. The veterinarian is dominated by his knowledge of anatomy, physiology, pathology and hygiene, and he is impartial as he seldom is as a breeder for profit. These different standpoints do not necessarily oppose each other. With wisdom and skill they can be made co-operative, but they certainly have often lead to objections, antagonism or open fight by one party or the other, until both have learned by observation and experience that one can safeguard and help the interests of the other.

We must make liberal concessions to the farmer-breeder about the important part of the work he is to play in breeding operations for his own benefit and the benefit of the country at large. The breeding of horses and live stock generally, like all other products of the soil and pursuits of men, are sources of national prosperity, or failing, may become a national calamity. This is the broad view that must be taken on the breeding problems by all parties concerned, the breeder as the producer, the veterinarian as his advisor, the user as a consumer, and the state as a protector.

To do efficient work in this realm, we must divide our work into sections. It is one thing to be a successful worker in the biological laboratory studying embryology and trying to unfold the still unexplained facts of fecundation and the functions of the reproductive organs generally. A great field of research is there open. It is another thing to understand and teach the

theories of practical breeding, so numerous, interesting and quite valuable; it is yet another thing to apply our veterinary knowledge to the often demanded practices in assisting in the acts of copulation, during pregnancy, at birth, and to prevent or successfully treat the defects and specific diseases of the new-born and growing animals. But the important fact we have yet to learn ourselves and to preach to our farmer-breeders is the broad, scientific fact, in its innumerable details, that not every country or part of country can produce every kind of breed; that all species, varieties, breeds, etc., of domestic animals are confined to restricted environments, to particular soils and climates, if they are to strive and survive; that in North America and in sections thereof, comprising larger or smaller areas, only such breeds can be maintained with profit and constancy that have survived and have permanently adjusted themselves to similar environments somewhere else. Such animals can produce true types as to size, shape, weight, temperament, color and organic peculiarities needed for certain climates and particular purposes. Or to use an illustration: We should, as veterinarians, prevent our breeders from importing the tall, heavy-weight Clydesdale stallion into the arid, hot, dry and rocky sections of Texas, Arizona, New Mexico to produce a farmer's draft-horse, because this horse is a product of a soil luxuriant in grain, cool in climate and demanding heavy work. We should warn other breeders that they cannot perpetuate the lightweight, fleet Arab horse in the cold and moist north, because he is unprotected against cold by his fine coat of hair, and his capacious lungs with wide-open air-passages expose him to danger not present in his warm, dry native country, which necessitate constant migration for food. The Clydesdale belongs to the north and the Arab to the southwest and not vice versa.

The general ignorance of these facts among the breeders of this country has led in the past to that haphazard breeding and production of useless horses that has lately been so much criticized, and that the well-informed veterinarian can explain as due to the introduction of parent-stock into wrong environments, resulting in the offspring paying the penalty of degeneration, decay or even extinction. We cannot always keep on trying to produce breeds by constantly importing breeding animals from countries where they have become fixed types and let the progeny go to waste in our country. Of the millions of horses in the United States there are thousands upon thousands of this useless kind.

The above thoughts may serve as an introduction into the

subject and as an attempt to point out the many sides of the question before us, as looked upon from the standpoint of veterinary science. They may likewise encourage the young men of our profession, who have yet their life-work before them, to embrace a veterinary branch which is still new in this country, but one that is bound to develop because needed, and one that will pay in coin and honors to those among us who have the faculty to study breeding deeply and the ability to direct their learning into practical channels of successful application.

OLAF SCHWARTZKOPF.

THE Missouri Veterinary Medical Association will convene at Marshall, Mo., at 9.00 a. m. on Monday, July 29, and continue two days. The following papers have been promised: "Snap Shots by a Beginner in Practice," Dr. D. F. Luckey, Bloomfield; "Common Animal Parasites Found in Missouri" (lantern slide illustrations), Dr. A. T. Kinsley, Kansas City; "Death of Mules Due to Parasites," Dr. Horace Bradley, Windsor; "My Experience in Immunizing Against Hog Cholera," Dr. F. M. Starr, Odessa; "Removal of Urinary Calculi," Dr. J. H. MacCartney, Joplin; "Canine Practice," Dr. J. C. Flynn, Kansas City; reports of cases: Dr. Carl F. Fischer, Garden City; Dr. W. E. Neil, Kirksville; Dr. O. Stuart, Paris; paper, title not given, Dr. J. W. Connaway, Columbia.

A banquet will be served at the Elks' Home on Monday evening, and the meeting will be terminated by a clinic at the hospital of Drs. Welch and Blosser, Tuesday afternoon.

This promises to be a largely attended meeting because the problems of uniform sanitary regulations and uniform certificates of health will be presented to the membership by the State Veterinarian, Dr. S. Sheldon.

There is a lively interest in proposed modification of the present Practice Act, and every veterinarian in the state is urged to participate in this meeting with the view of arriving at a working understanding that something definite may be accomplished.

THE PUBLISHED PROCEEDINGS OF THE SIXTEENTH ANNUAL MEETING of the Indiana Veterinary Medical Association, recently received, is a credit to that active organization, and to those whose duty it has been to edit and publish it. It makes a valuable little booklet that every member of the association should be proud to possess and preserve.

OBITUARY.

ALBERT T. LEACH, M. D. V.

Dr. Albert T. Leach died at the home of his parents, in Somerville, Tenn., on Tuesday, May 21, 1912, after a year's illness. Dr. Leach was born in Somerville, Tenn., December 21, 1881, and was educated in the public school of that place, and the Branhamard Hughes school of Spring Hill, Tenn. He was graduated from the McKillip Veterinary College in 1909 after a three years' course of studies in that institution, receiving the degree of doctor of veterinary medicine (M. D. V.). His home life was the best, his love and consideration for mother and sisters beautiful. This kind trait in his character, and his ability as a veterinarian, was fast building for him a place high up in his profession, when ill health overtook him and resulted in his untimely death at the age of 30 years. He is survived by a father, mother, two sisters and six brothers.

CHARLES RADCLIFFE FAIRCHILD, D. V. M.

Dr. Charles Radcliffe Fairchild met his death on February 29 last in the 26th year of his life, by being struck by a train while driving across the New York Central Main street crossing, at Bergen, N. Y. Dr. Fairchild was born in Binghamton, N. Y., March 25, 1886, but at an early age came to West Winfield, Herkimer county, where he received his early education, graduating from the West Winfield High School in June, 1907. He entered the New York State Veterinary College at Cornell University, the fall of the same year, from which institution he graduated in June, 1910. On receiving his degree in veterinary medicine, he went to Gowanda, N. Y., to take charge of the practice of Dr. J. V. Hills of that place, during his absence abroad. Dr. Fairchild came to Bergen, N. Y., in September, 1910, where he practised until the time of his death, and was making a large number of friends and building up a good practice. The doctor was married May 17, 1911, to Miss Viola A. Ross, of Bergen, who, with an infant daughter, Ruth Evelyn Fairchild, survive him.

CORRESPONDENCE.

HILLSBORO, O.

Editor AMERICAN VETERINARY REVIEW, New York:

In March number, page 806, a "curious case of cryptorchidy" is related, translated from the French. The case is called a "quadriorchidy" and claimed to be the first.

After reading it carefully, I am convinced the "small body" removed from each side was nothing more than an enlarged epididymis.

I have known cases that had been similarly operated upon and afterward had to be really castrated.

Yours truly,

S. R. HOWARD.

TAMPA, FLA., June 9, 1912.

Editors of AMERICAN VETERINARY REVIEW, New York, N. Y.:

In reply to Drs. Deavenport and Heiny, of Mississippi, as to their case of paresis, I can say that in my short experience of eight years in and around Tampa, Fla., I have found such cases as they report not unusual, and the air pressure treatment always successful. I well remember my first case of this class, for it fooled me for three days. The cow was not down, but staggered some when forced to move, rumination suppressed and the animal constipated. These symptoms I read as digestive disturbance and so treated. There was no recent calf, nor was one expected. On the third day I entered the yard about noon, found the cow down, lying in normal position, but unable to rise when called upon to make the effort. I then decided to try inflating the udder as a last resort. The animal was up and apparently normal that evening and gave no further trouble. Since that experience I have never hesitated to use the air treatment where there is any indication of paresis, unaccounted for by traumatism or some other equally well marked condition. I have had one case in a non-pregnant cow, where the last calf was a yearling or older. This animal had been down more than twenty-four hours when I was called to the case. All the neighbors, including a dairyman or two, who really did know from which end of a cow the milk came, had

told the owner his cow must die. Inflated the udder about six o'clock in the evening, cow was up at midnight and ready for breakfast the next morning. I have treated one case within a month, where the last calf was six months old and the cow, if pregnant, of recent conception. History of having eaten some canteloupes, but no apparent disturbance, except that the bowels were loose. Unable to do anything but sway the body, when asked to rise. Inflated udder at noon, cow was still down that evening but comfortable, so let her alone; up and all right the next morning. I usually have several such cases in the course of a year. My most prolonged case was in a member of an Italian dairy and the paresis did follow parturition in the usual manner. She was down a full week, during which time I inflated the udder every day. She finally got up and made a good recovery. My most pronounced case was also truly p.p.p. It was during our rainy season, in the summer of 1907. Again in the middle of the day I was called to a cow which I found in a Cuban's back yard with water ankle deep in the dry places. When I looked over the fence, I saw the cow lying on her right side, with the left flank looking like a balloon and no breathing that I could see. I told the people that she was dead; they said no, so I went on in. Close inspection showed that she was breathing, or getting an inspiratory movement about once in thirty seconds; the eyes were glazed and did not react when touched with the finger. I then told the owner, talking through an interpreter, that if his cow was not dead, she soon would be, but that I would try, if he so desired. They said to do all I could. My first move was the trocar, then inflation and then hypodermically, a cardiac tonic. By this time my cow was breathing almost normally and had come up onto her sternum. There was a swarm of Cuban onlookers and we got enough of them to place the animal on some tobacco sacking and carry her under a shed that only leaked between the boards. That evening she was up and out of the paralyzed condition. She developed a case of pneumonia and I pulled her through that, and when I was paid the owner was well enough pleased to present me with a quart bottle of imported brandy.

In my estimation, the term parturient paresis is wrong. Cerebral anemia comes much nearer describing the condition. Any exciting cause that will take the normal supply of blood away from the brain will produce it. An article published some time ago in the REVIEW, I think by a German correspondent, cited cases occurring in cattle just off railroad shipment. In this

region almost all our dairy cattle are high-grade Jerseys and we produce none of our own feed stuff. Consequently our cattle receive little or no succulent feed, their diet being almost entirely nitrogens and carbohydrates. These, of course, are intended to, and do, increase the activity of the lacteal glands and may, in a measure, account for the not uncommon paralytic condition that I find.

FRED W. PORTER, D.V.M.

ARMY VETERINARY DEPARTMENT.

The work for the passage of the Army Veterinary bill is progressing steadily. Chairman Hoskins of the legislative committee, American Veterinary Medical Association, reports that it will be necessary to obtain a two-thirds vote in the House of Representatives to push the bill forward on the calendar. He has no fear of the ultimate outcome of the bill in the House, as about 200 members of the House are pledged in support of the bill.

More than 40 Senators are also pledged, but otherwise the situation in the Senate remains one of anxiety, as it seems difficult to get action on the bill by the sub-committee in charge of the bill.

There are several reasons why the bill should be passed during the present session of Congress, the main being that opposition other than congressional may spring up during the next session. While it is impossible to predict, at this writing, what will be really accomplished during this session, on account of the political turmoil in which Congress finds itself now, there are indications that Congress may remain in session well into the month of July, which will extend the time for work and be in favor of the persistent efforts of Chairman Hoskins in behalf of this bill.

O. S.

DR. ARTHUR TRICKETT has joined the firm practicing in connection with the Kansas City Veterinary College, which now consists of Drs. S. Stewart, F. F. Brown, J. V. Lacroix and A. Trickett. Dr. Trickett has been practicing in Kansas City for the past 10 years and has established an excellent clientele.

SOCIETY MEETINGS.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY.

The regular monthly meeting of this association was held in the Berns Veterinary Hospital, 74 Adams Street, Brooklyn, New York, June 5.

The minutes of the May meeting were read and approved. The resignation of Dr. Wilfred Lellmann was unanimously accepted.

Dr. D. J. Mangan, of New York City, was then introduced, and read an original, exhaustive, scientific paper entitled "Auto Therapy." Its application in the treatment of septic diseases in horses. Dr. Mangan stated that he has been working along this line of treatment since last September, having been induced to do so by reading of the wonderful results obtained by this form of treatment, as originated by Dr. Chas. H. Duncan, Attending Surgeon, Volunteer Hospital, New York City.

It will be superfluous to quote from Dr. Mangan's article in these minutes, as it will be published in full before these minutes are read to the members at the October meeting.

Dr. Chas. H. Duncan followed Dr. Mangan, and read an excellent paper, going into the detail of this form of treatment as used by him in human practice. Dr. Duncan has been working and experimenting with this treatment for about five years, and has had some wonderful results in cases that were considered hopeless.

Dr. Duncan stated that this form of treatment was first used by a veterinarian in Europe by the name of Lux, in the treatment of sheep in 1822, but when he tried to get results in another province, he failed, and was puzzled by his failure. Dr. Duncan explained that Lux's failure was due to using his original solutions of pus and scab in a different locality where the infection probably differed.

It is due to this same reason that results from the so-called stock bacterins are so doubtful.

When Dr. Duncan had concluded his remarks, Dr. Berns expressed his appreciation of the excellent papers presented, and stated that in view of the fact that the subject was entirely new

to nearly every one present, that it would be best to defer the discussion of this subject till the October meeting, so that the members might read and digest the same.

Dr. R. W. Ellis, in a few well chosen remarks, expressed the appreciation of all present of the exceptional character of the programme rendered by Drs. Mangan and Duncan, and supplemented his remarks by reminding the gentlemen present of an article by Professor Liautard in the AMERICAN VETERINARY REVIEW, of two or three years back, on *Autoserotherapy* and its application in the treatment of pleurisy; finally moving that a vote of thanks be tendered both gentlemen. This was unanimously carried.

Dr. R. H. Kingston cited a case of hydro-thorax in a horse from which a large quantity of serum was drawn off the first day, and on the second day seven quarts were drawn off. Forty c.c. of this serum was injected in each shoulder two days in succession. The results in this case at present are that the formation of fluid seems to have been checked and the temperature is reduced to normal. Animal is also eating well.

Dr. Mangan also cited a case of hydro-thorax in which he reinjected the serum with complete recovery resulting.

Dr. Berns stated that he would announce the appointment of delegates to the New York State and the American Veterinary Medical Associations at a later date.

The Surgical Division of the programme consisted of several very interesting operations, and an exhibit of convalescing surgical cases.

Case No. 1. Roan Gelding. Punctured wound of the foot. Placed on table and resection operation done by Dr. R. W. Gannett.

Case No. 2. Brown Mare. Lame, due to bony growth, resembling a spavin, on the knee. Placed on the table and Median Neurotomy performed by Dr. Chas. E. Clayton. This mare moved sound when removed from the table.

Case No. 3. Grey Gelding. Punctured wound of the foot in the region of the bar, with a sinus running through to hollow of the heel, also the lateral cartilage involved. Placed on the table and operated on by Dr. H. B. Risley.

Convalescing cases exhibited by Dr. Berns.

Case No. 1. Bay Gelding. Open navicular bursæ. Operated on May 3, 1912, by Dr. R. W. Gannett. Very nearly healed and stepping good.

Case No. 2. Bay Mare. Quittor. Operated on April 28 by Dr. H. B. Risley. This mare is still lame, due to a ring bone, which the doctor intends to fire and blister. The Quittor operation was successful.

Case No. 3. Bay Gelding. Open coronary pedal joint. Operated on May 4 by Dr. R. W. Gannett. Doing nicely.

Case No. 4. Bay Gelding. Laryngeal Hæmiplegia. Operated on by Dr. H. B. Risley May 10, 1912. Present indications point to a complete success.

Case No. 5. Chestnut Gelding. Punctured wound of the foot, involving the navicular joint. Bad case. Operated on May 30, 1912, by Dr. H. B. Risley, who found the foot in such bad condition that he removed the navicular bone with his fingers. Considering the case hopeless the foot was temporarily bandaged, and the animal returned to a box stall to be destroyed in the morning. The horse appeared so much better and brighter in the morning that he was again placed on the table and the operation completed. The indications are now that a recovery will take place.

Case No. 6. Grey Gelding. Lacerated wound of hip. Operated on by Dr. Geo. H. Berns. Doing well.

Case No. 7. White Gelding. Quittor. Operated on April 3, 1912, by Dr. R. W. Gannett. This case was doing nicely, and almost ready to be discharged. This animal was regarded with a great deal of interest, as Dr. Berns stated that eight years ago this horse had a bad attack of hydro-thorax. Seventy quarts of serum was removed from the chest cavity.

There were forty-five members and visitors present, and it was conceded by all to have been a very interesting and successful meeting.

As the meeting adjourned at midnight, Dr. Berns was saluted with three rousing cheers, showing the appreciation of the members of the association toward the genial host of the evening.

R. S. MACKELLAR,
Secretary.

SOCIETY OF COMPARATIVE MEDICINE, NEW YORK STATE VETERINARY COLLEGE.

Monthly meetings of the Society of Comparative Medicine have been held regularly during the spring semester. A few of the seniors have read papers upon various topics pertaining to Veterinary Medicine before the Society.

Dr. J. H. Taylor, of Henrietta, N. Y., spoke before the student body at the College, April 12. His subject was "Valuable Hints for the Veterinarian."

Dr. F. H. Miller, of New York City, university trustee, was here April 26 and gave the veterinary students a very instructive address upon "Canine Diseases and Their Treatment."

Dr. David W. Cochran, of New York City, read a paper before the veterinary student body May 17 upon "The Principles of Horseshoeing." Some very interesting specimens of horseshoeing were presented to the college musem by Dr. Cochran.

The Society gave its annual dance in the Masonic Hall, May 2.

The last meeting of the Society was held in the College auditorium May 22. President J. K. Bosshart gave a short address and presented the members of the senior class with the shingles of the Society. Dr. Moore, Director of the College, gave a talk in which he emphasized the work of the alumni in alumni associations as to their value to the College, to the Veterinary profession, and to the Science of Veterinary Medicine and urged that each alumnus become an active member of some prominent veterinary association.

Mr. W. C. Buck, 1912, spoke upon "The Athletics of 1911-1912."

The following members were elected to office for the ensuing term: President, Mr. A. C. Goff, 1913; Vice-President, Mr. N. E. Koenig, 1913; Secretary, Mr. A. L. Smith, 1914; Athletic Manager, Mr. F. H. Schaeffer, 1913; Assistant Athletic Manager, Mr. J. Vara, 1914; Treasurer, Mr. J. A. Harris, 1914; Corresponding Secretary, Mr. D. W. Clark, 1913.

R. RAY BOLTON,

Corresponding Secretary.

THE new Mayor, Mr. H. J. Arnold, of Denver, Colo., is to be congratulated in breaking away from ward politicians in making his appointments of milk inspectors and meat inspector.

He has recently appointed Dr. M. J. Warner Chief Meat Inspector, Dr. P. Guyselman and Dr. E. A. Grubb Milk Inspectors. These three doctors are graduates of the Division of Veterinary Medicine, Colorado State Agricultural College, year 1912.

NEWS AND ITEMS.

Dr. R. F. Bourne, of Kansas City, and wife are making a tour through the Yellowstone Park.

Dr. O. W. Collins, Magnolia, Ark., says, in renewing his subscription: "I find that I could not practice veterinary medicine without the Review."

Veterinary Notes, Volume V., Number 3, June, 1912, is a particularly interesting number, the perusal of which will prove valuable to veterinary practitioners.

The Cornell Veterinarian, Volume II, No. 1, is not only up to the standard set in the first number issued, but far exceeds it, and we congratulate its editorial staff on their work in its production.

Dr. S. Forrest Musselman, Cynthiana, Ky., in renewing his subscription to the Review says: "I am glad to do this, as I enjoy the Review and get so much valuable information from it. I feel that I am getting all my money's worth. Hoping that the Review will continue in the same way, and reach me promptly, I beg to remain, etc."

Dr. R. C. Longfellow of the Toledo Clinical Laboratories is doing a great amount of work in the preventive treatment of rabies in human beings, in addition to his general clinical laboratory work in diagnostics and the preparation of biological remedies for both physicians and veterinarians; and we have found his letter issued to his patrons under date of June 1 instructive.

Dr. Wm. V. Lusk, Second Cavalry, and Dr. Burt English, Second Cavalry, arrived in San Francisco on June 15, 1912. They are to be stationed with their regiment at Ft. Bliss, Tex. For the past two years they have been stationed in Mindanao and Sulu, Philippine Islands, the latter being the extreme southern limit of the stations of American troops.

THE next annual meeting of the Iowa Veterinary Medical Association will be held at the Iowa State College, which will be the occasion of the dedication of the new veterinary buildings and the celebration of the 25th anniversary of the Iowa Veterinary Association.

THE commencement exercises of the Colorado Agricultural College were held in the college chapel Thursday, June 6, 1912. The following students having completed their work in veterinary medicine, were granted the degree of Doctor of Veterinary Medicine: Brill, J. A.; Carroll, A. N.; Converse, C. W.; Egan, P. H.; Griffith, A. H.; Grubb, E. A.; Guyselman, P.; Paxton, J. D.; Warner, M. J.; Williams, C. V.; Willis, H. W.; Wright, G. A. Mr. Wright also received the degree of Bachelor of Science, having also completed that course.

TWENTY-FIVE THOUSAND DOLLARS FOR ONTARIO'S VETERINARY COLLEGE: The Dominion in its grant to aid Ontario agriculture, has provided $25,000 for the purchase of additional land for the new Ontario Veterinary College. This purchase will be about double the size of the lot purchased last year, and will give the land necessary to finish out the block of the present L-shaped site, with a view to later extending the college to be a Dominion institution; the aim being to broaden its work, and to keep it the centre of veterinary knowledge in Canada. At present it is the only college of its kind in the Dominion.

INVESTIGATIONS OF THE ETIOLOGY OF INFECTIOUS ABORTION OF COWS AND MARES is the subject treated of in *Bulletin No.* 165, Kentucky Agricultural Experiment Station, April 1912. From a perusal of this bulletin it becomes evident that Prof. E. S. Good has not only confirmed Bang's work as to the etiology of the disease in cows, but has determined the cause of the disease in mares. He has given in this bulletin the cultural characteristics of the *abortusbacillus*—Bang, in detail; also methods of isolating the bacillus from the uterine exudate of aborting cows, as well as from the internal organs of the fetuses. This is probably the first publication in the United States giving illustrations of the morphology of this germ, as well as its cultural characteristics, and is of extreme interest to veterinarians. We understand that a copy of this bulletin can be obtained free of charge until the supply is exhausted by applying to the director of the station, Dr. M. A. Scoville, Lexington, Ky.

VETERINARY MEDICAL ASSOCIATION MEETINGS.

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list :

Name of Organization.	Date of Next Meeting.	Place of Meeting.	Name and Address Secretary
Alumni Ass'n, N. Y.-A. V. C.....	.....	141 W. 54th St.	J. F. Carey, East Orange, N. J
American V. M. Ass'n.....	Week Aug. 26,'12	Indianapolis..	C. J. Marshall, Philadelphia
Arkansas Veterinary Ass'n.....	.....	.....	J. B. Arthur, Russellville.
Ass'n Médécale Veterinare Française "Laval".....	1st and 3d Thur. of each month	Lec. Room, Laval Un'y, Mon.	J. P. A. Houde, Montreal.
B. A. I. Vet. In. A., Chicago.....	2d Fri. ea. mo...	Chicago.....	H. A. Smith, Chicago, Ill.
B. A. I. Vet. In. A., So. Omaha ..	3d Mon. ea. mo.	S. Omaha, Neb	E. J. Jackson, So. Omaha.
California State V. M. Ass'n.....	.....	San Francisco.	J. J. Hogarty, Oakland.
Central Canada V. Ass'n.....	.....	Ottawa	A. E. James, Ottawa.
Central N. Y. Vet. Med. Ass'n....	June and Nov...	Syracuse	W. B Switzer, Oswego.
Chicago Veterinary Society.....	2d Tues. ea. mo	Chicago	D. M. Campbell Chicago.
Colorado State V. M. Ass'n.....	Jan., 1913	Denver	B. F. Kaupp, Ft. Collins.
Connecticut V. M. Ass'n.....	Feb. 6, 1912.....	Hartford	B. K. Dow, Willimantic.
Delaware State Vet. Society.....	Jan. Apl. Jy. Oct.	Wilmington ..	A. S. Houchin, Newark, Del.
Essex Co. (N. J.) V. M. A.....	3d Mon. ea. mo.	Newark, N. J.	J. F. Carey, East Orange, N. J.
Genesee Valley V. M. Ass'n.....	.....	.....	J. H. Taylor, Henrietta.
Georgia State V. M. A.....	Dec. 21-22, 1911.	Atlanta.....	P. F. Bahnsen, Americus.
V. M. A. of Geo. Wash. Un'y.....	2d Sat. ea. mo..	Wash., D. C..	A. T. Ayers.
Hamilton Co. (Ohio) V. A.....	.....	.....	Louis P. Cook, Cincinnati.
Idaho Ass'n of Vet. Graduates....	Oct. 10-12, 1911..	Boise.....	G. E. Noble, Boise.
Illinois State V. M. Ass'n.....	July 9. 1912. ...	Springfield ...	L. A. Merillat, Chicago.
Indiana Veterinary Association...	Jan. 15-16, 1913..	Indianapolis ..	A. F. Nelson, Lebanon.
Iowa Veterinary Ass'n.....	.....	.....	C. H. Stange, Ames.
Kansas State V. M. Ass'n...	January, 1913...	Topeka.	J. H. Burt, Manhattan.
Kentucky V. M. Ass'n.....	Oct. & Feb. ea. yr	Lexington	Robert Graham, Lexington.
Keystone V. M. Ass'n.....	.....	.....	E. H. Yunker, Phila.
Louisiana State V. M. Ass'n.....	.....	.....	E. P. Flower, Baton Rouge.
Maine Vet. Med. Ass'n	July, 1912.....	Portland.....	C. W. Watson, Brunswick.
Maryland State Vet. Society.....	.....	Baltimore.....	H. H. Counselman, Sec'y.
Massachusetts Vet. Ass'n.....	4th Wed. ea. mo.	Young's Bost'n	J. H. Seale, Salem.
Michigan State V. M. Ass'n.....	Feb. 6-8, 1912...	Mich. Agr. Col.	Judson Black, Richmond.
Minnesota State V. M. Ass'n.....	July 10-11, 1912.	Minneapolis...	G. Ed. Leech, Winona.
Mississippi State V. M. Ass'n....	.....	.....	Wm. P. Ferguson, Grenada.
Missouri Valley V. Ass'n.....	.....	.....	Hal. C. Simpson, Denison, Ia.
Missouri Vet. Med. Ass'n	July 29-30, 1912..	Marshall	S. Stewart, Kansas City.
Montana State V. M. A.....	Jan. 29-30, 1912.	Bozeman	A. D. Knowles, Livingston.
Nebraska V. M. Ass'n.....	January, 1912....	Lincoln.....	W. H. Tuck, Weeping Water.
New York S. V. M. Soc'y.....	Jy 30-31, Aug. 1	Utica.....	H. J. Milks, Ithaca, N. Y.
North Carolina V. M. Ass'n.....	June 1912	Raleigh.....	M. J. Ragland, Salisbury.
North Dakota V. M. Ass'n.....	Fair Week, 1912.	Fargo.....	C. H. Babcock, New Rockford.
North-Western Ohio V. M. A.....	Feb and Nov...	Lima.	A. J. Kline, Wauseon.
Ohio State V. M. Ass'n.....	.....	.....	Reuben Hilty, Toledo.
Ohio Soc. of Comparative Med..	Annually	Up'r Sandusky	F. F. Sheets, Van Wert, Ohio.
Ohio Valley Vet. Med. Ass'n.....	.....	.....	J. C. Howard, Sullivan.
Oklahoma V. M. Ass'n.....	Dec. 14-15, 1911.	Okla. City....	C. E. Steel, Oklahoma City.
Ontario Vet. Ass'n.....	April, 1912.....	Toronto	C. H. Sweetapple, Toronto.
Pennsylvania State V. M. A.....	September, 1912.	.....	John Reichel, Glenolden.
Philippine V. M. A.....	Call of President	Manila.....	David C. Kretzer, Manila.
Portland Vet. Med. Ass'n.....	4th Tues. ea. mo.	Portland, Ore.	Sam. B. Foster, Portland, Ore
Province of Quebec V. M. A.....	.....	Mon. and Que.	Gustave Boyer, Rigaud, P. Q.
Rhode Island V. M. Ass'n.....	Jan. and June..	Providence ...	J. S. Pollard, Providence
South Carolina Ass'n of Veter'ns	.....	.....	Clarence E. Smith, Greenville
So. Illinois V. M. and Surg. A....	Jan. 2-3, 1912...	Centralia	F. Hockman, Louisville.
St. Louis Soc. of Vet. Inspectors.	1st Wed. fol. the 2d Sun. ea. mo.	St. Louis.....	Wm. T. Conway, St. Louis, Mo.
Schuylkill Valley V. M. A.....	June 19, 1912....	Reading	W. G. Huyett, Wernersville.
Soc. Vet. Alumni Univ. Penn.....	.....	Philadelphia..	B. T. Woodward, Wash'n, D. C
South Dakota V. M. A.....	2d Tues. July '12	Aberdeen.....	S. W. Allen, Watertown.
Southern Auxiliary of California State V. M Ass'n.....	Jan. Apl. Jy. Oct.	Los Angeles..	J. A. Dell, Los Angeles.
So. St. Joseph Ass'n of Vet. Insp..	4th Tues. ea. mo.	407 Ill. Ave....	H. R. Collins, So. St. Joseph.
Tennessee Vet. Med. Ass'n.....	.....	....	A. C. Topmiller, Murfreesboro
Texas V. M. Ass'n.....	Mar. 18 19, 1912..	Fort Worth...	R. P. Marsteller, College Sta
Twin City V. M. Ass'n.....	2d Thu. ea. mo .	St. P.-Minneap	S. H. Ward, St. Paul, Minn.
Utah Vet. Med. Ass'n.....	Mar., 1912	Logan	A. J. Webb, Layton.
Vermont Vet. Med. Ass'n	.....	....	G. T. Stevenson, Burlington.
Veterinary Ass'n of Alberta.....	.....	.....	C. H. H. Sweetapple, For.
Vet. Ass'n Dist. of Columbia.....	3d Wed. ea. mo..	514—9th St., N. W.....	Saskatchewan, Alta., Can. M. Page Smith, Wash., D. C
Vet. Ass'n of Manitoba.....	Midsummer Fair	Winnipeg.....	F. Torrance, Winnipeg.
Vet. Med. Ass'n of N. J.....	July 11, 1912....	Jersey City...	E. L. Loblein, New Brunswick.
V. M. Ass'n, New York City.....	1st Wed. ea. mo.	141 W. 54th St.	R. S. MacKellar, N. Y. City
Veterinary Practitioners' Club....	Monthly	Jersey City ...	A. F. Mount, Jersey City.
Virginia State V. M. Ass'n	July 11, 1912....	Newport News	Geo. C. Faville, Norfolk.
Washington State Col. V. M. A..	1st & 3d Fri. Eve.	Pullman.....	R. J. Donohue, Pullman.
Washington State V. M. A.....	Jan 9-10, 1913...	Wenatchee....	Carl Cozier, Bellingham
Western Penn. V. M. Ass'n.....	3d Thurs. ea. mo.	Pittsburgh....	Benjamin Gunner, Sewickley
Wisconsin Soc. Vet. Grad	July, 1912.....	Janesville.....	J. P. West, Madison.
York Co. (Pa.) V. M. A.....	June 4, 1912.....	York.....	E. S. Bausticker, York, Pa.

PUBLISHERS' DEPARTMENT.

Subscription price, $3 per annum, invariably in advance; Canadian subscriptions, $3.25; foreign countries, $3.60; students while attending college, $2; Students in Canada, $2.25; single copies, 25 cents. **Copy for advertisements should be received by 10th of month.**

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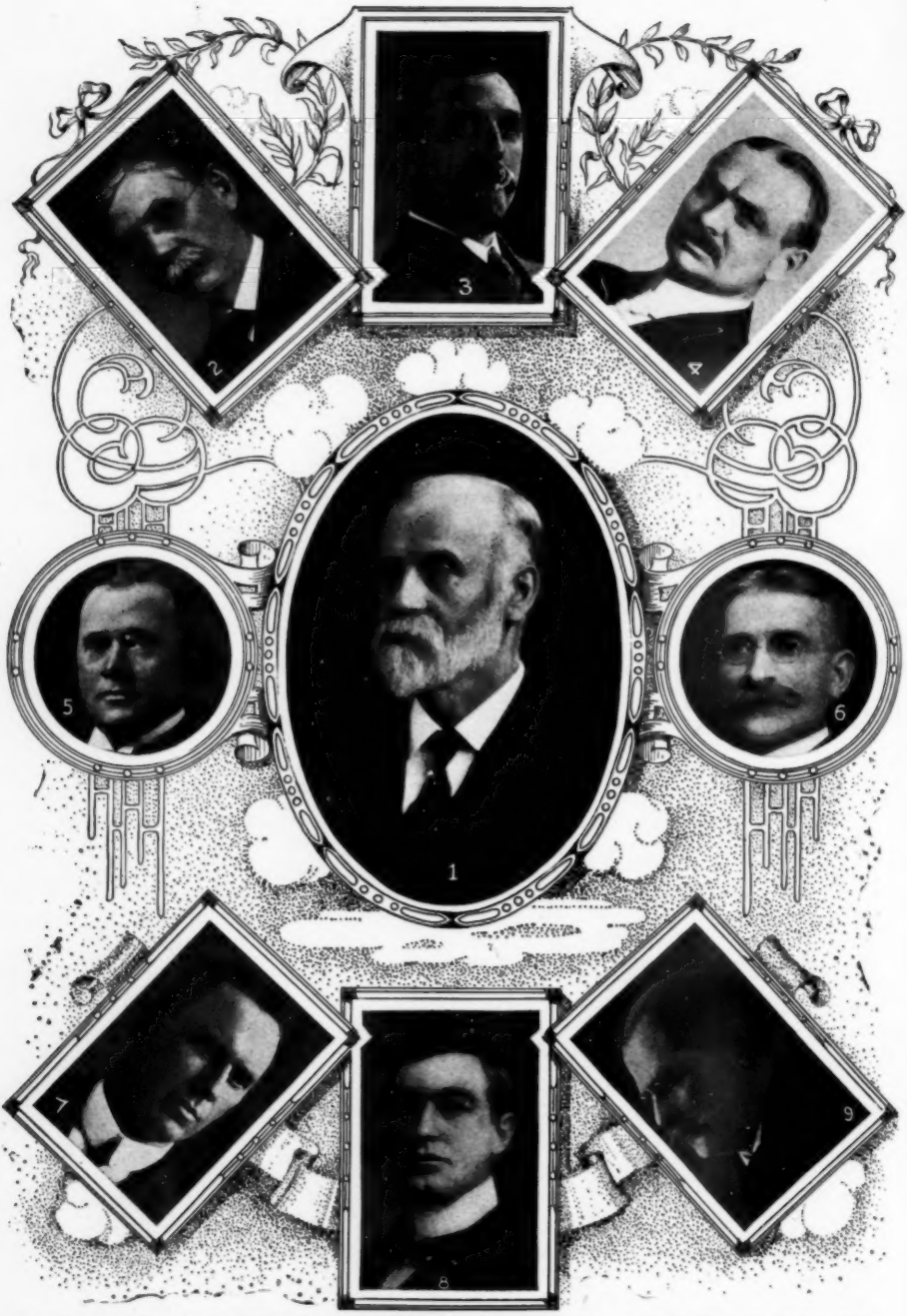
THE CHICAGO MEDICAL BOOK COMPANY is bringing out some excellent up-to-date veterinary works, for which the veterinary profession are under obligations to them. See announcements on page 12 (adv. dept.), this issue.

MODERN VETERINARY MEDICINES OF MERIT are what all modern veterinarians require; and if they will look carefully into the list of specialties imported by C. Bischoff & Co., Inc., on page 9 (adv. dept.), present issue, they will find them both modern and meritorious.

BE PREPARED FOR THOSE SUMMER COUGHS by laying in a little stock of Glyco-Heroin (Smith). You know how persistant they are, and you know how efficacious this preparation is. It is also an excellent agent to break up the coughs of distemper in dogs.

THE PURELY VEGETABLE TONIC bearing the trade name of "*Red Ball Brand Stock Food*" is an excellent stomachic and digestive regulator as stated in the announcement of the manufacturers on page 28 (adv. dept.) of this issue. Write the Atkins and Durbrow people about it.



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